ENGL DEPT.

FLEET OWNER

DEVOTED TO THE BETTER OPERATION AND MAINTENANCE OF ALL AUTOMOTIVE FLEETS
Vol. 33 December 1944 No. 6

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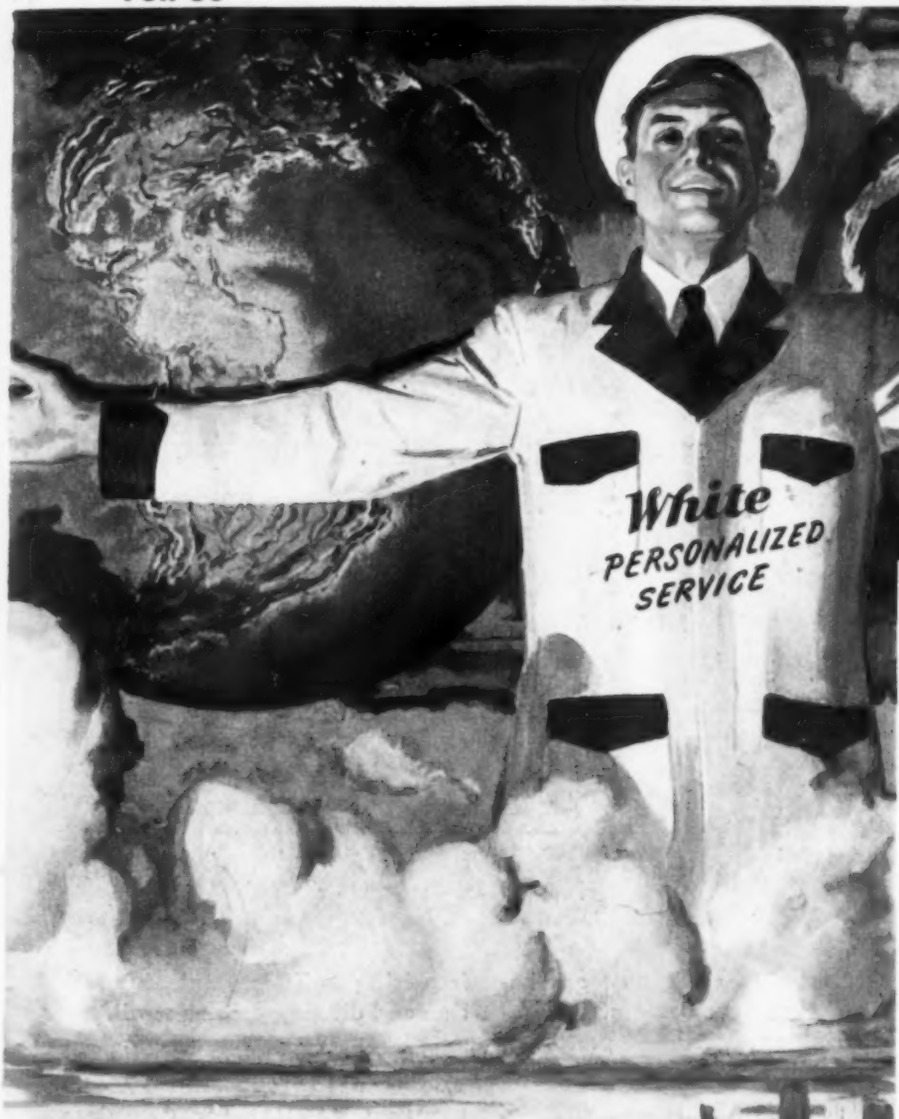


SURVIVAL OF THE FITTEST

Essential home front transportation . . . vital to the nation in war and peace . . . is in the midst of a struggle for survival. The supply of motor trucks has been dwindling for nearly three years. Practically none can be replaced. In an effort to give real help to all owners of motor trucks in this critical situation, White pioneered *Personalized Service*. It is unlike any other truck maintenance plan. It is far more comprehensive. It will work for you—regardless of where your service work is done. It will postpone the day of the last mile built into your truck. Your local White Branch or Dealer will furnish full information.

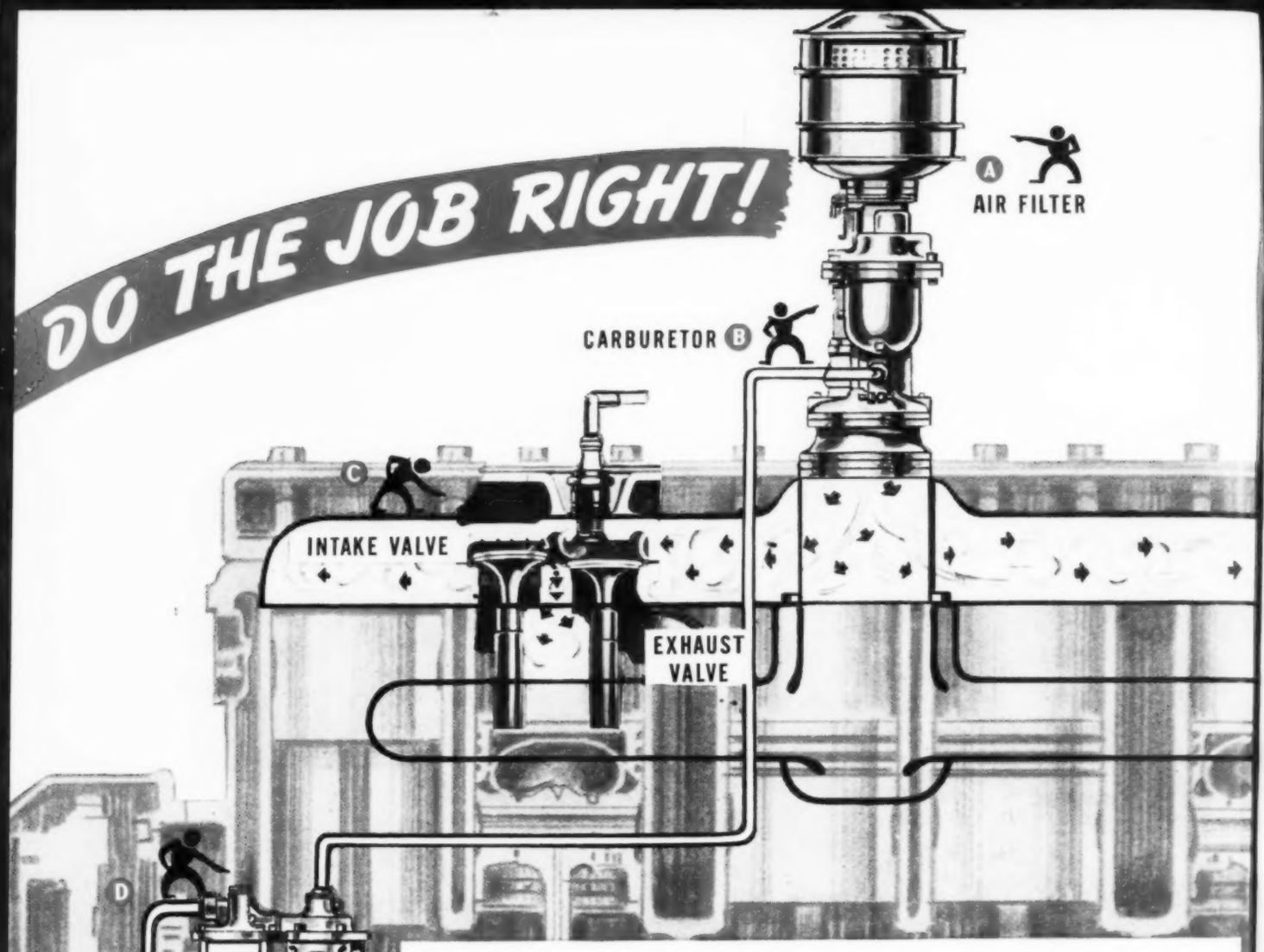
THE WHITE MOTOR COMPANY
Cleveland, Ohio, U. S. A.

A limited number of new Super Power Whites is now in production for essential services. Your White representative will be glad to help you make application.

White

FOR MORE THAN 40 YEARS THE GREATEST NAME IN TRUCKS

DO THE JOB RIGHT!



Check fuel system to Reduce ring and wall wear

RAMCO 10-Up rings save gas because they compensate for wear without using excessive wall pressures.

However, no rings can overcome the waste of inefficient carburetion. Proper carburetion, too, is important to long ring life.

Too lean mixtures cause overheating, shorten ring life. *Too rich mixtures* cause excessive ring, piston, and wall wear by allowing raw gas to get into the combustion chamber, impairing cylinder wall lubrication and diluting crankcase oil.

Check for the conditions indicated above, using the FREE RAMCO SERVICE MANUAL for complete procedures.

See your Ramco jobber or write Ramsey Accessories Mfg. Corp., 3713 Forest Park Blvd., St. Louis 8, Mo. In Canada, 364 Richmond Street, Toronto. Factories at St. Louis and Fruitport, U.S.A., and Windsor, Canada.

Copyright 1944, Ramco

A. Clogged Air Cleaner

B. Worn Jets
Wrong Size Jets
Worn Butterfly Valve
Improper Float Level
Dirty Carburetor
Leaky Gaskets

C. Cracked Manifold
Leaky Gaskets

D. Faulty Pump Pressure
Faulty Accelerating Pump
Faulty Automatic Choke

SPIRO-SEAL
BRIDGES THE GAP
Provides greater pressure on down than on up stroke.

RE-POWER with
RAMCO 10 up
PISTON RINGS
ALL PURPOSE RINGS Specially Designed for TRUCKS and FLEETS

★ GET INTO THE FIGHT! BUY MORE WAR BONDS AND STAMPS!

In war or peace
B.F.Goodrich
FIRST IN RUBBER

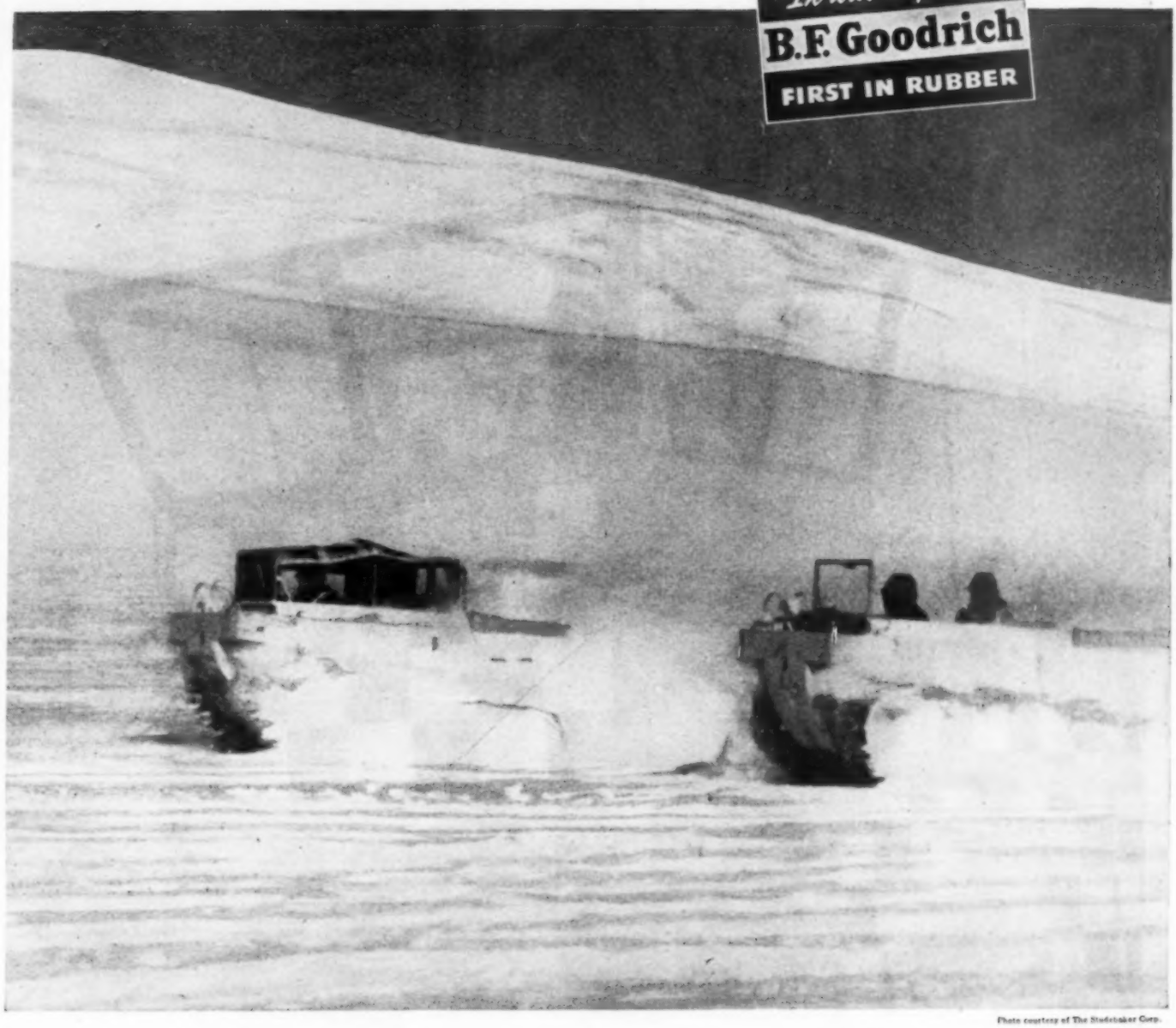


Photo courtesy of The Studebaker Corp.

Cars on snowshoes

A typical example of B. F. Goodrich development in rubber

WHEN there was danger that the Japs might invade Alaska the army needed a new kind of vehicle to travel fast on deep snow—or on ice, through water, swamps or on hard roads. It had to have "tank treads", not wheels, and it had to be so light it would "float" on snow.

B. F. Goodrich men had developed light rubber-covered treads for "half-track" vehicles, but even those were too heavy. Could they be made much lighter? Could "fins" be added to push against snow, but which still wouldn't touch ground on a hard road? Could they get the answers *quickly?*

For fastening rubber to metal, rubber men had always used *molds*—and molds took six months to make. B. F. Goodrich developed a method of blowing the rubber on the metal with compressed air. It was faster and worked just as well. They designed new treads while an automobile company was designing the machine itself. The "weasel", as it is called, is one of the fastest things *off* wheels. They used it in France instead of Alaska, but the snowshoes turned out to be the best kind of sandshoes and mudshoes.

B. F. Goodrich research goes on in war or peace and applies to every kind of tire—passenger-car, truck, farm, industrial. No tire is too good to be improved or too standardized to change when needs of users or materials available have changed.

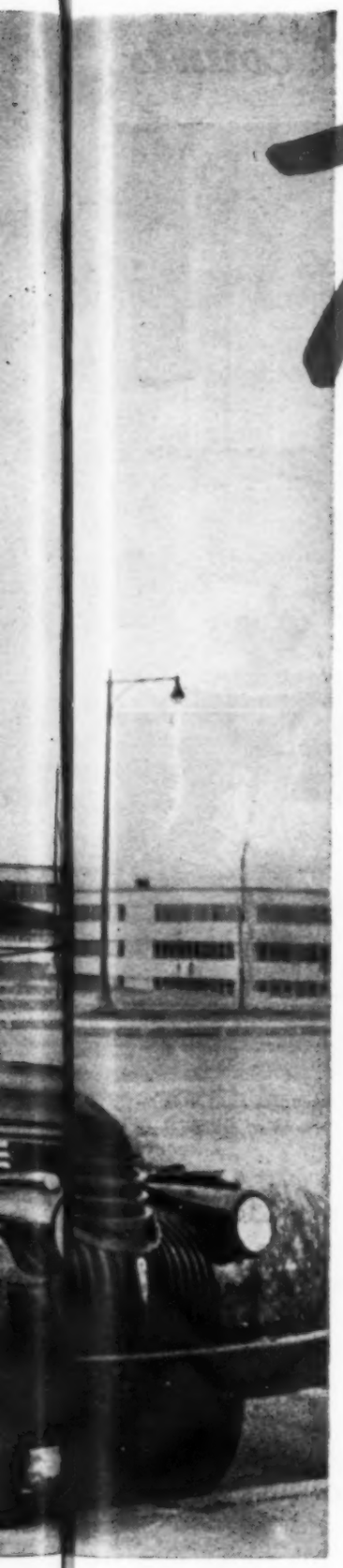
Urgent military needs like this have caused a temporary shortage of truck tires. During that shortage, B. F. Goodrich dealers offer you special service to help make your present tires last longer. Let them help you, and when you must have new tires get those backed by this policy of constant improvement. The B. F. Goodrich Company, Akron, O.

B.F. Goodrich
Truck & Bus Tires

FLEET OWNER, December, 1944. Vol. 33, No. 6. Published monthly by the Ferguson Publishing Co., 90 West St., New York 6, N. Y. Subscription price $3.00 per year in the United States and Canada. Single copies 35¢. Acceptance under the act of June 5th, 1934, authorized April 24th, 1941.

TEXACO

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON SUNDAY NIGHT



Trucks

HAVE CONTROL OF THE AIR!

VERSATILE trucks, equipped with special electric-generating units, take on another wartime job . . . as mobile air traffic control towers on newly-built fields at the front. The man in the tower is testing one of the first units.

Whether in military use at the front—or in civilian use here at home—trucks require the right lubricants for economical, full-power performance. That's why so many commercial fleet operators use Texaco.

Texaco D-303 Motor Oil, for example, has the properties of detergency and dispersion. Detergency keeps piston rings and engine parts clean. Dispersion holds deposit-forming materials in suspension until drained at oil-change time. *Texaco D-303* protects modern bearings and prevents scuffing of rings, pistons and cylinders.

For quieter-running, longer-lasting transmission and differential gears, use Texaco transmission and differential lubricants.

So effective have Texaco lubricants proved that they are definitely preferred in many fields, a few of which are listed below.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

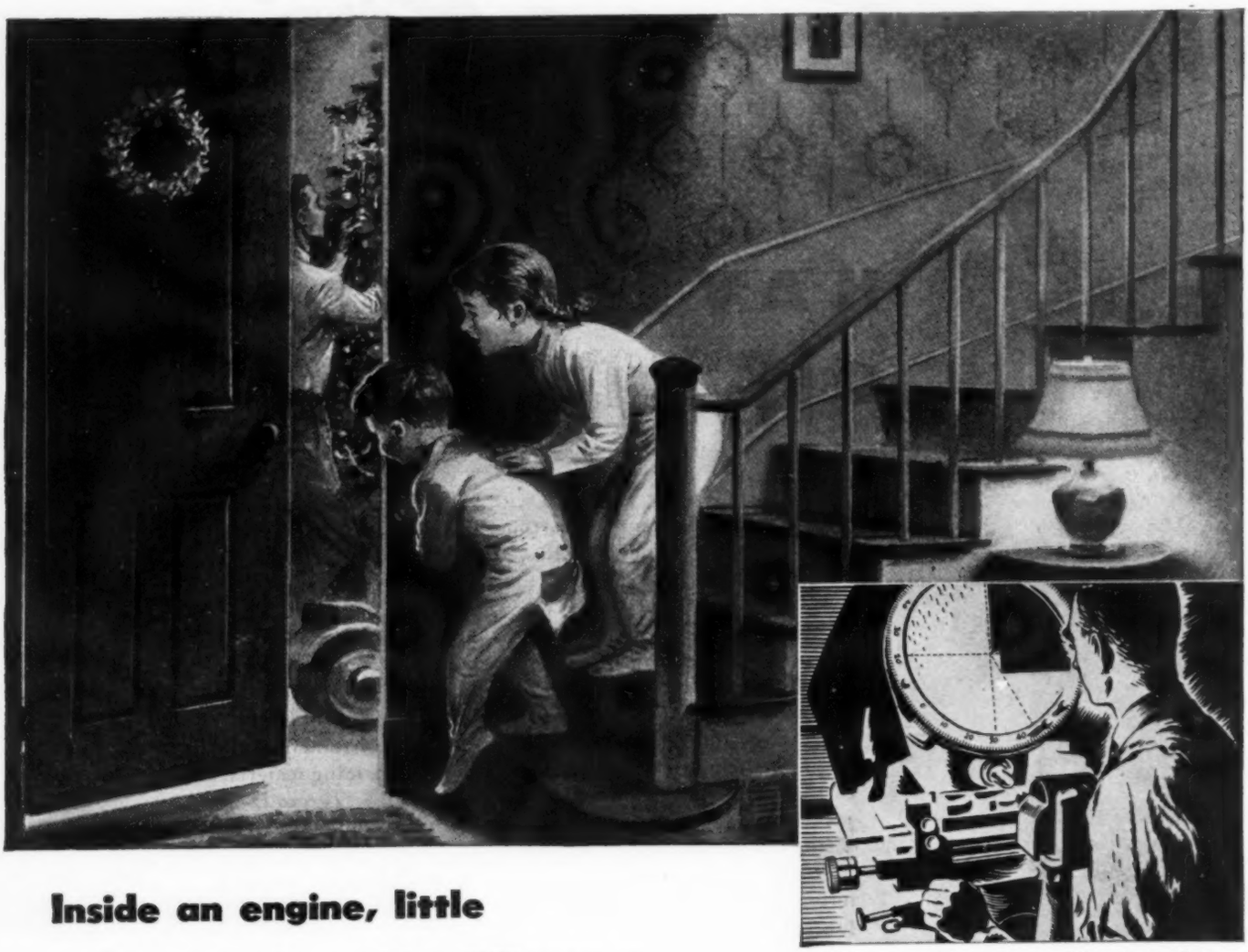
Lubricants and Fuels

FOR THE TRUCKING INDUSTRY

METROPOLITAN OPERA BROADCASTS SATURDAY AFTERNOONS

Please mention FLEET OWNER *when writing to advertisers.*

It's what goes on INSIDE that counts



Inside an engine, little things make a big difference

"Comparator" greatly magnifies ring ends to make possible precision-check of all angles.

TAKE piston rings of identical design. Variances in width, thickness, diameter, flatness, or circularity, may be so little that they cannot be detected by the naked eye. Yet, inside an engine, these little things can affect performance as much as 50 per cent or more.

Pedrick *precisioneered* piston rings deliver full power for longer life because they are precise in every way. Precision of dimensions and characteristics is assured by special manufacturing processes, developed through long years of experience . . . and by constant checking by our carefully trained laboratory technicians.

Pedrick *precisioneered* piston rings are available in Engineered Sets for reconditioning all popular truck, bus, and car engines. They not only deliver important oil savings and increased power, but their longer life means fewer overhauls with less "out-of-service" time per vehicle.

WILKENING MANUFACTURING CO., Philadelphia 42, Pa. *In Canada:* Wilkening Manufacturing Co. (Canada) Ltd., Toronto.

Pedrick

precisioneered **PISTON RINGS**

America's No. 1 Christmas Gift—
A WAR BOND

"But, Cricherton, you had the truck with Diamonds on it Yesterday!"

THERE'S no question about it—Diamonds are great favorites with truckers, especially today when runs are long and roads are rough. To help speed the time when these fine tires will be available in unlimited quantities, practice conservation—give synthetics *extra* care. Make regular air pressure check-ups, reduce your speed, and recap when necessary. Your country needs your truck *on the road.*

Diamond

"HEAVY SERVICE" TRUCK TIRES • AKRON, OHIO • LOS ANGELES, CALIF.

World-Proven in the Toughest
AUSCO
HYDRAULIC JACK
AUTO SPECIALTIES MFG. CO.

Testing-Grounds of All Time!
AUSCO'S Post-War
Hydraulics
Limited Number Now Available to You
● In freezing sub-zero blasts—under scorching desert sun—through drenching monsoon rains —on fighting fronts in all climes, these Ausco Jacks are daily demonstrating their speedy, trouble-free, easy, dependable operation and *proving* that they're practically indestructible!
● Easing military requirements now permit that a limited number of these battle-tested Ausco Jacks, with their many, advanced post-war features, are available now to those with proper priorities.
● Ask your Jobber for particulars, and if you find that right now you can't get the Ausco Jacks you need . . . we can promise you they're well worth waiting for! Auto Specialties Mfg. Co., St. Joseph, Mich., Windsor, Ont., Canada.
ARMY
NAVY
Watch AUSCO
for the Latest in Jacks
FOLLOWING IS A PARTIAL LIST OF WAR MATERIALS AUSCO IS HELPING TO PRODUCE:
Ordnance Ammunition Steel Castings ☆ Trench Mortar Bombs ☆ Complete Tracks for Tanks and Combat Vehicles ☆ Hydraulic and Mechanical Jacks

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MAKING car and truck finishes last longer is one form of preventive maintenance that pays dividends in the time and money it saves in refinishing.

So take advantage of this tip . . . wash your cars and trucks with that quick-acting, SAFE material . . .

OAKITE COMPOSITION No. 70

It rapidly removes road grime and grease, does it easily, rinses away completely, leaves NO STREAKS. Equally important is that it does not harm painted or lacquered body surfaces . . . does not affect colors. This safety factor of Oakite Composition No. 70 prolongs life of finishes . . . saves money for you.

Free Booklet Gives Details

If you are interested in low-cost body washing and establishing economies in connection with other preventive maintenance jobs, send for free 36-page Booklet giving details. It's yours for the asking . . . write today.

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Technical Service Representatives in All Principal Cities of the United States and Canada

OAKITE *Specialized* CLEANING

MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

FLEET OWNER

(Automotive Fleet Headquarters)

Charter ECA Member

Published Monthly in the interests of Automotive Fleet Owners, who do all or part of their own Service, and devoted to the Better Operation and Maintenance of Truck, Trailer, Bus Passenger Car, Taxicab and all Automotive Fleets.

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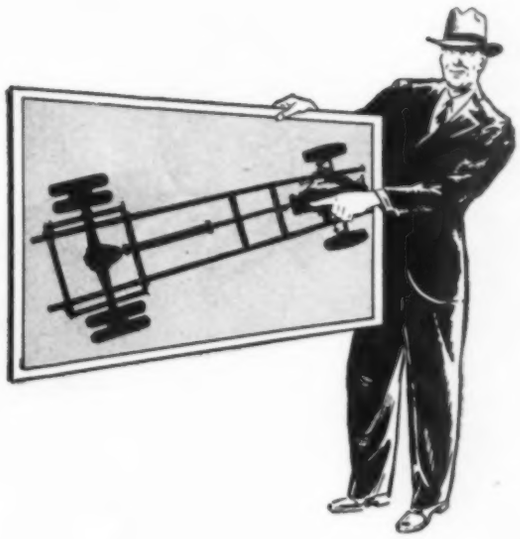


Eliminate deposits in transmissions just as you would in crankcases . . . use

heat-proofed
Stanolube HD

Gasoline Powers the Attack . . . Don't Waste a Drop!

WHAT? Use the same oil for engine crankcases and truck transmissions? Yes! Your Standard Oil Automotive Engineer is right when he recommends Stanolube HD for transmissions in which you are having trouble with varnish, oxidation sludge, deposits, and corrosion. Here's why:

Transmissions frequently run as hot or hotter than engine crankcases. Heat and agitation are the two greatest enemies of any lubricant—they cause oil oxidation, which, in turn, combines with dirt and other contaminants to form sludge and varnish-like deposits found in engines operated under heavy-duty service. For the same reason, these deposits form in transmissions when they become overheated.

Stanolube HD has a combination oxidation inhibitor and detergent additive. It resists the formation of oil oxidation products and also keeps these and other contaminants from settling out of the oil.

Engine tests show Stanolube HD ranks highest in the combined qualities that a heavy-duty oil should have. Fleet records show that Stanolube HD eliminates varnish and other engine deposits. If you are having trouble with transmission failures, let a Standard Oil Automotive Engineer analyze your problem. Perhaps his recommendation of the right grade of Stanolube HD may save making many replacements of scarce transmission parts and bearings.

Call the local Standard Oil Company (Indiana) office, or write 910 South Michigan Avenue, Chicago 80, Illinois, for the Automotive Engineer nearest you. In Nebraska, write Standard Oil Company of Nebraska at Omaha 2.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ **FLEET CONSERVATION SERVICE**

Mr. Hi-Q Offers "Hot Tip" for Cold Weather Driving

Mr. Hi-Q: Good morning, gentlemen! I see you are having a little battery trouble today.

Bus Manager: A little trouble? Say, we're having *plenty* of it . . . and these cold mornings don't help a bit.

Mr. Hi-Q: Tell me, have you ever considered standardizing on your *manufacturer's highest quality batteries?* I believe that would eliminate a lot of this grief and help you keep your busses on the road where they're so badly needed.

Bus Manager: Perhaps *they* would help some, but how much do they cost?

Mr. Hi-Q: Not a great deal more than ordinary batteries. Besides, many bus operators maintain that top-quality batteries actually *cost less per mile* in the long run.

Bus Manager: Are they really so much better?

Mr. Hi-Q: I'm sure you'll find that they will last longer, stand up better. They have stronger plates, better separators and heavier cases. Also, most manufacturers equip these batteries with Fiberglas* Retainer Mats.

Bus Manager: Just what function do they serve?

Mr. Hi-Q: Standard tests show that they greatly reduce battery failures formerly traceable to shedding of power-producing material from the positive plates.

Bus Manager: That *should* help.

Mr. Hi-Q: It sure does. Tests show that batteries equipped with Fiberglas last up to twice as long as the same batteries without the mats.

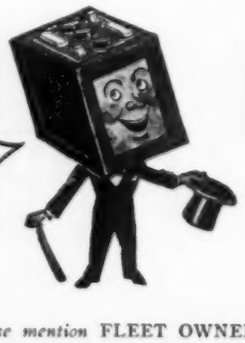
Bus Manager: *Now,* you're talking my language. Will my regular distributor have these batteries?

Mr. Hi-Q: Yes! Just ask him for his manufacturer's top-of-the-line batteries . . . Fiberglas-equipped, of course.

Owens-Corning Fiberglas Corporation, 1962 Nicholas Building, Toledo 1, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ontario.

ARMY E NAVY

YOU CAN'T FIND A BETTER BUY THAN THE BEST BATTERIES— FIBERGLAS-EQUIPPED



FIBERGLAS

*T. M. Reg. U. S. Pat. Off.

BATTERY RETAINER MATS

"YES--IT'S A HEIN-WERNER

--it costs no more to have the best"

5 Tons

12 Tons

Super-Powerful... Easy Operating ...Absolutely Dependable...

HEIN-WERNER HYDRAULIC JACKS

are made in models of 3, 5, 8, 12, 20, 30 and 50 tons capacity.

For details and latest prices, ask your H-W jobber, or write us

HEIN-WERNER MOTOR PARTS CORP.
WAUKESHA, WISCONSIN

8 Tons

HEIN-WERNER HYDRAULIC JACKS
Are Built Right and Priced Right

20 Tons

...and the Emergency Brakes are TRU·STOPS

That's a very significant thing to say about a new bus or truck or tractor-trailer combination. And here's why:

The manufacturer of that vehicle could have installed cheaper emergency brakes that would meet legal requirements. He wanted to give you more. In equipping with **TRU-STOPS,** he gave you extra value in terms of greater safety, better brake performance and lower brake maintenance cost.

It has been proved over and over again that **TRU-STOPS** cost less per mile. The manufacturer who equips your vehicle with **TRU-STOPS** is giving you the benefit of that over-all economy.

Write our Detroit office for specific information about **TRU-STOP** *Emergency* **BRAKES.**

TRU-STOP *Emergency* **BRAKES**

Operate on propeller shaft. Disc-type. Positive, sure. A flow of air is circulated through the disc. This air dissipates the heat of braking. Thus linings last far longer—brake service is required less often. Drivers can help save service brakes by increased use of emergency brake.

TRU·STOP *Emergency* **BRAKES**

AUTOMOTIVE AND AIRCRAFT DIVISION

6-235 General Motors Building, Detroit 2 • 695 Bryant Street, San Francisco 7

a Division of AMERICAN CHAIN & CABLE COMPANY, INC., Bridgeport, Conn.

ESSENTIAL PRODUCTS • TRU-LAY Aircraft, Automotive, and Industrial Controls • TRU-LOC Aircraft Terminals • AMERICAN CABLE Wire Rope • TRU-STOP Brakes • AMERICAN Chain • WEED Tire Chains • ACCO Malleable Castings • CAMPBELL Cutting Machines • FORD Hoists, Trolleys • HAZARD Wire Rope • MANLEY Auto Service Equipment • MARYLAND Bolts and Nuts • OWEN Springs • PAGE Fence, Shaped Wire, Welding Wire • READING-PRATT & CADY Valves • READING Steel Castings • WRIGHT Hoists, Cranes • WILSON "Rockwell" Hardness Testers

In Business for Your Safety

Here's Why

MARMAN *Clamps* SAVE YOU MONEY

The MARMAN UNIVERSAL, SERIES 820

1. LASTS LONGER

Constructed of high tensile stainless steel, the Marman Universal is corrosion resistant and wears indefinitely.

2. EASIER TO INSTALL

Cuts clamp installation time. Exclusive design permits instant installation and removal without tools.

3. REDUCES CLAMP STOCK

3 sizes handle hose diameters from ⅛" to 3-½". Two or more clamps can be combined to clamp larger diameters.

4. CAN BE USED OVER AND OVER

In actual tests, Marman Universal clamps have been used over and over without any efficiency loss.

5. EXTRA MARGIN OF SAFETY

Vibration-proof design of the Marman Universal eliminates costly breakdowns due to clamp inefficiency or failure.

Marman also makes standard fixed contour hose clamps in stainless steel and aluminum alloy, as well as the Marman Quick-Coupler in stainless steel or aluminum alloy. Write today for new folder, Series 820.

KEEP 'EM ROLLING

MARMAN PRODUCTS CO. Inc.
940 WEST REDONDO BOULEVARD
INGLEWOOD, CALIFORNIA

BUY WAR BONDS

RUGGED···RELIABLE

Built to Serve You Well

DELCO HEAVY-DUTY BATTERIES

There's the promise of long, dependable service in the way Delco commercial batteries are built: heavy, long-life plates . . . dual insulation that can really "take it" . . . rugged, sturdy cases to absorb the punishment of hard use.

But more important than the *promise* is the *proof*. Scores of fleet owners, operating both heavy and light equipment, have testified that Delco commercial batteries are the most economical, the most dependable batteries they have ever used. These recommendations come from some of the best-known fleets in the nation.

Delco commercial batteries for gasoline-powered equipment, and special Diesel-type Delco batteries to meet the extra requirements of Diesel cranking, are the product of Delco-Remy's extensive engineering experience, research facilities and technical skill. See your nearest Delco battery distributor for the right Delco commercial batteries to meet your needs.

WAR BONDS SAVE LIVES

Delco heavy-duty batteries for trucks, buses and other commercial vehicles are sold through independent distributors and United Motors Service branches located in all parts of the country.

UNITED SERVICE MOTORS

Delco-Remy

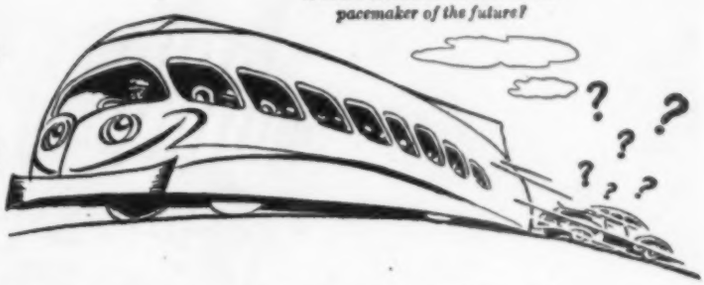
DIVISION, GENERAL MOTORS CORPORATION

WHEREVER WHEELS TURN OR PROPELLERS SPIN

Facts and Flashes

From the
ETHYL CORPORATION
Chrysler Building, N. Y. C.

Will the commercial vehicle be the pacemaker of the future?



While the general public tends to think of the passenger car as being the pacemaker for automotive development, it is in fact the commercial vehicle that is more apt to depart from conventional design.

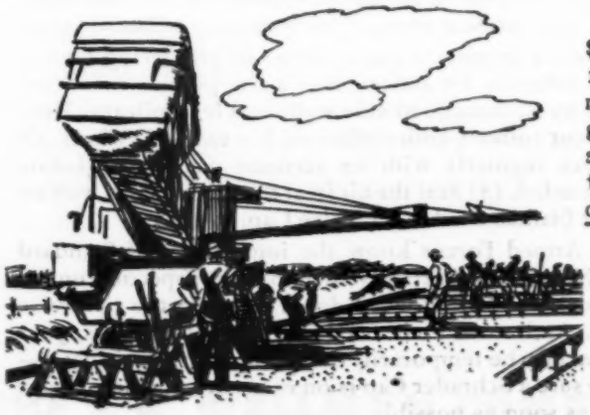
For example, passenger car engines have remained practically 100% under standard front-end hoods, but there are any number of trucks and buses now on the road with engines mounted in the rear, amidships or under the driver's seat. Likewise, power-brakes and air-conditioning, rare on prewar passenger cars, are commonplace on commercial vehicles.

The reason for this leadership of the commercial vehicle is that it is sold largely to technically trained operators. The manufacturer of trucks and buses does not have to contend with the prejudices of the non-technically trained general public.

Therefore, we may expect designers of postwar commercial engines to pay considerable attention to the possibilities of higher octane fuels. You, as a fleet operator, can appreciate that it is the cost per ton or passenger-mile that counts, rather than the price per gallon of the fuel. The fact that a particular engine requires 80, 90 or even 100 octane gasoline would not dismay you, if your fuel costs were more than justified by the performance and economy obtained.

This readiness of fleet operators to accept and utilize technical advances might well create a postwar automotive world in which fundamental progress will be paced by developments in bus and truck engines.

* * *



$1,300,000,000 WORTH OF ROAD BUILDING in each of the first three postwar years is anticipated. With new motor vehicles and gasoline restrictions eased, a great era of over-the-road transportation can be foreseen. In addition, the farmer's problem of getting crops to market will be eased. And road work will provide hundreds of thousands of jobs both directly and indirectly.

EXPERTS IN TIRE REPAIR follow U. S. troops wherever they go. These G. I.'s are trained to restore seemingly worthless truck tires and tubes and are experts in rotation, inflation, overloading and driving methods. Units of tire men have done much to add life to the rubber in combat.

Late Flash

PACIFIC WAR WILL be a bigger, more costly operation than most people realize. Long-range action over vast areas will require more of everything than the European invasion—more gasoline and oil, more planes, more amphibious tanks, more supply ships. That's why U. S. Treasury says 6th War Loan is most important of all. Digging into your pocket at home is a lot easier than digging into a foxhole.

OR- **THIS?**

Would you use an elephant if your tires wore out? Of course not—but one might be handy if you couldn't get the new tires you need. With 150,000 cars going off the road every month, many because of worn out tires, you had better "baby" your present tires, if you want to continue driving.

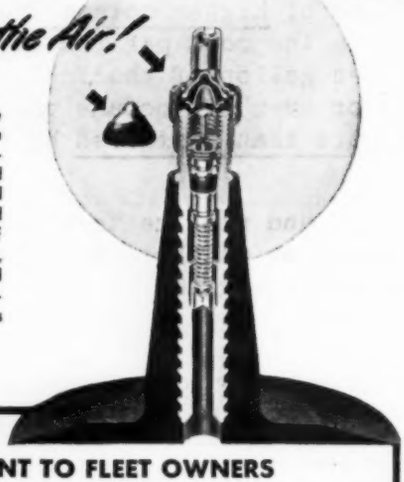
The most important single factor in preserving tires is proper inflation, for lack of even a few pounds causes excessive wear, damage to side walls and less mileage. How to prevent ruinous underinflation? It's easy. (1) Check air pressures regularly with an accurate gauge. (2) Inflate when needed. (3) Seal the air in at the valve mouth with an airtight Standard Schrader Valve Cap.

Our Armed Forces know the importance of Standard Caps. No pneumatic-tired vehicle passes inspection unless a Standard Cap is screwed down tight on the tire valve mouth. And since their need is greater than ours, your supplier may be temporarily out of caps. Try again later—and be sure a Schrader Cap is on every tire, including your spare, as soon as possible.

ORIGINATORS OF THE COMPARATIVE AIR LOSS SYSTEM

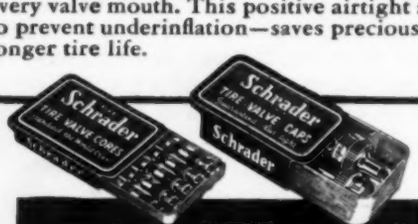
This Seals the Air!

All Standard Schrader Valve Caps in use today contain the specially designed sealing unit with a dome-shaped rubber washer vulcanized between two dome-shaped BRASS plates. Because of their unique construction, these caps are guaranteed airtight up to 250 lbs. pressure. This mighty midget does the work.



IMPORTANT TO FLEET OWNERS

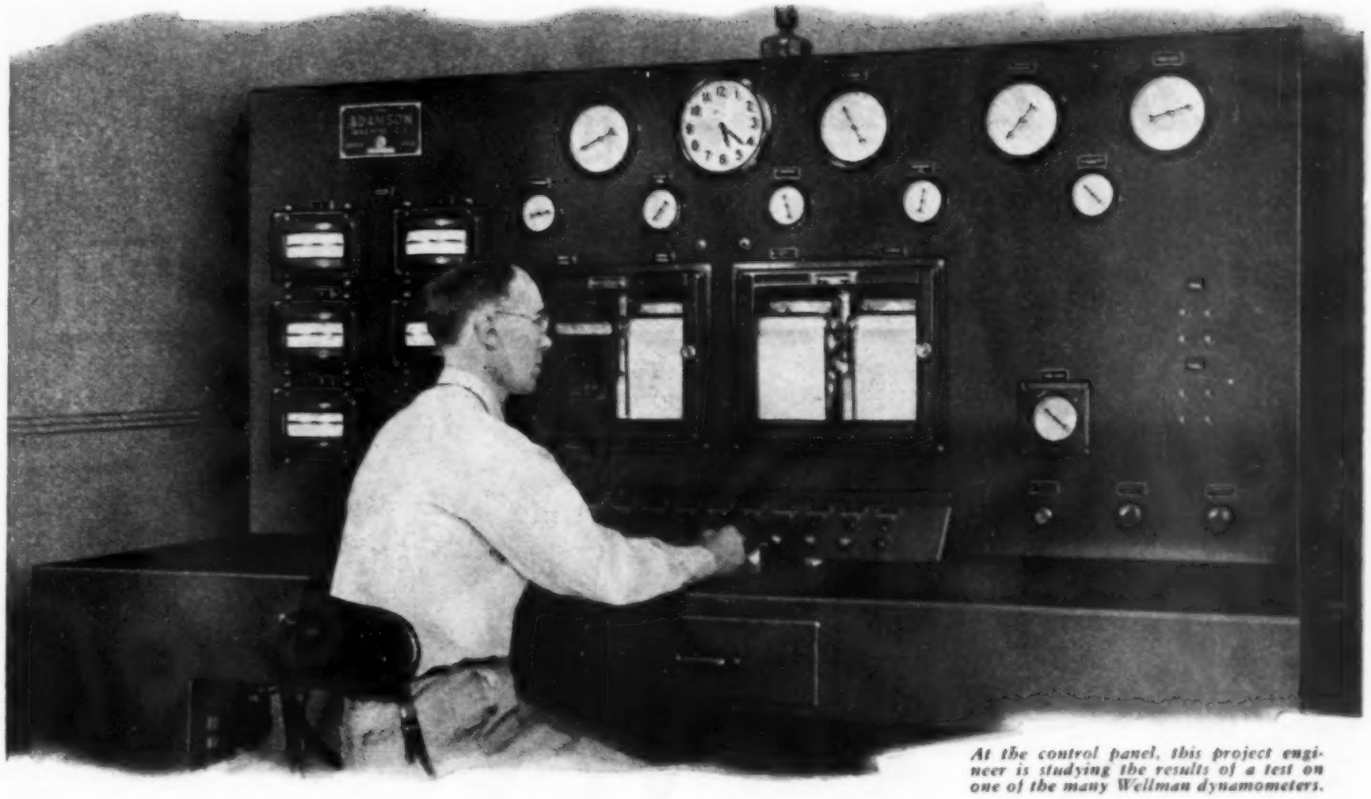
Constant and effective tire care is no longer a matter of choice. Now it's vital—to keep vehicles rolling. So be sure each tire is checked daily with an accurate Schrader gauge, then properly inflated—and that an airtight Schrader Cap is screwed down fingertight on every valve mouth. This positive airtight seal—helps to prevent underinflation—saves precious rubber for longer tire life.



Schrader
CONTROLS THE AIR

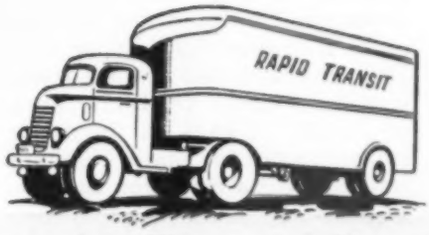
CAPS are vital for TIRE CONSERVATION

A. SCHRADER'S SON, ***Division of Scovill Manufacturing Company, Incorporated,*** **BROOKLYN, NEW YORK**



At the control panel, this project engineer is studying the results of a test on one of the many Wellman dynamometers.

Solving your problems of RUBBING SURFACES



FRICTION is developed when two surfaces are rubbed together. Friction lights a match . . . and it's friction that operates your clutches and brakes. In the great S. K. Wellman laboratories we are engaged in continuous study of powder metallurgy, to improve friction qualities of Velvetouch *all-metal* clutch facings and brake linings . . . to bring you dependable friction materials *engineered to your exact specifications.*

Specify Velvetouch replacement clutch facings, clutch plate assemblies and brake linings for your heavy duty buses and trucks.

THE S. K. WELLMAN COMPANY
1374 EAST 51st STREET • CLEVELAND 3, OHIO

Interesting Facts About FRICTION

If two rubbing surfaces are separated by a film of oil, the friction is almost independent of the nature of the surfaces.

As shown in the illustration, a 10 lb. block sliding on a non-lubricated surface, requiring 2 lbs. of force, has a .2 coefficient of friction. When the surface is lubricated, however, the force required is only 1 lb. and the coefficient of friction drops correspondingly to .1. As lubrication decreases, the coefficient of friction becomes more dependent upon the material of the surfaces.

For Brake and Clutch . . . Use Velvetouch

Velvetouch is ***all metal***— a combination of powdered metals, compressed, sintered and welded to a solid steel backing plate.

Florida "Payoff"

Entangled in Europe's Napoleonic turmoil, Spain failed to keep order in eastern Florida, which was overrun by adventurers, Indians and fugitive slaves. Marauders raided in Georgia, plundering and burning, and fled back to Florida, beyond the reach of U. S. authorities. Reparation claims piled up against Spain. The situation became so intolerable that our troops occupied western Florida in 1812. Under pressure, Spain gave up all of Florida in 1819, in return for our paying off claims of U. S. citizens against Spain amounting to $5,000,000. It was an advantageous trade for us and fair enough for Spain.

You, too, will make an ADVANTAGEOUS TRADE when you trade your ailing fuel pumps to your Jobber for—

Assembled with AIRTEX Diaphragms Guaranteed for 50,000 Miles

Factory Tested

AIRTEX

Exchange **FUEL PUMPS**

"Your profits climb with the AIRTEX Line"

BUY MORE BONDS

AIRTEX AUTOMOTIVE CORPORATION, FAIRFIELD, ILL.

CHEVROLET TRUCKS

VITAL WAR FACT!

1 out of every 3 trucks is a Chevrolet

Trucks are war workers, too. . . . In fact, *"Transportation spells Liberation"* by performing miracles of movement of men and supplies on the working front at home just as it does on the fighting fronts abroad. . . . Millions upon millions of vital war haulage jobs are being performed by Chevrolet trucks today with characteristic Chevrolet stamina and reliability.

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

BUY MORE WAR BONDS—AND KEEP THEM!

Serving All America

FARM PRODUCTS

ESSENTIAL CIVILIAN SUPPLIES

FOODSTUFFS

FUEL

LOGGING

VITAL WAR MATERIALS

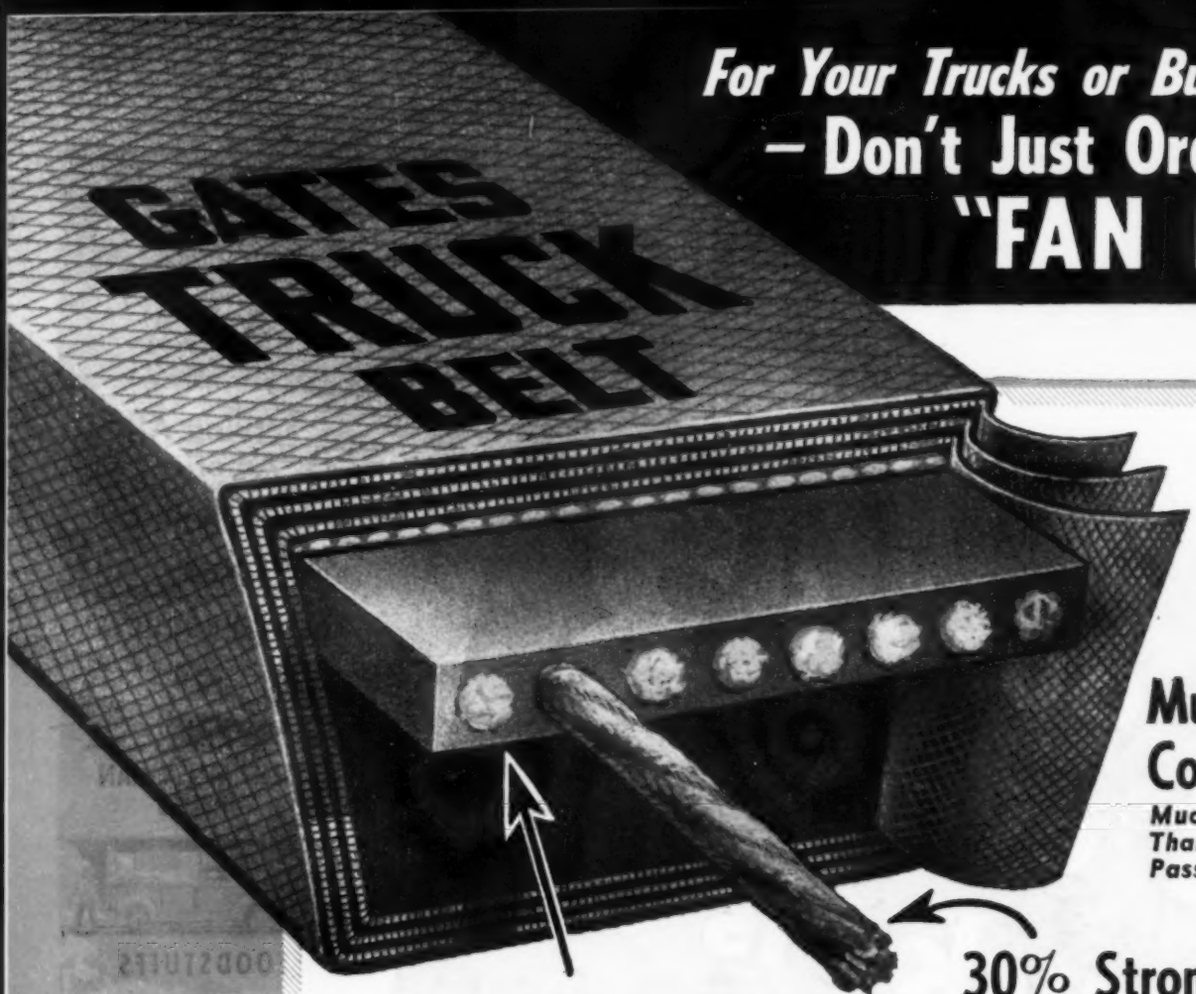
MUNITIONS

MINING

Note Well: 1 out of every 4 cars serving wartime America likewise is a Chevrolet

You'll say CHEVROLET **"FIRST IN SERVICE"**

For Your Trucks or Buses— — Don't Just Order a "FAN BELT"—



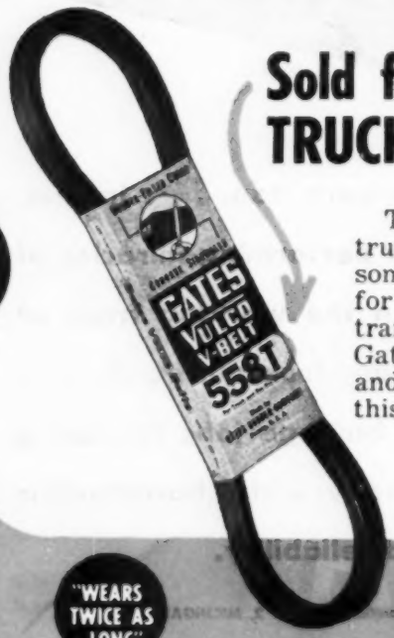
Multiple-Ply Cover . . .
Much Longer Wearing Than on Passenger Car Belts

30% Stronger Cords
Than Used in Passenger Car Belts

***Special* Heavy-Duty Compound**

Sold for TRUCK and BUS USE Only!

The Gates TRUCK Belt is sold for use on trucks and buses ONLY. This is because some of the materials used are allocated for this particular purpose. Truck and bus transportation is important in the war effort. Gates TRUCK Belts must be used on trucks and buses only. Each belt container bears this statement.



LOS ANGELES, Cal.

"In our heavy hauling from Arizona across desert and semi-desert regions with the thermometer frequently well over 100 degrees, we can run your Gates TRUCK Belt long after it would have been necessary to replace any other belt we have used."

—Consolidated Copper State Lines.
R. C. Hutchison,
Shop Supt.

"BEST EVER USED"

CHICAGO, Ill.

"On our more than 200 units in cross country service your special TRUCK belt operates air conditioning equipment in addition to the extra heavy belt load due to rear engine drives. We are getting 80% longer wear than any other belt has ever given in this unusually tough service."

—All American Bus Lines,
H. Weinstein,
Gen'l Pur. Agt.

"80% LONGER LIFE"

"WEARS TWICE AS LONG"

WELLSBORO, Pa.

"Since using your special TRUCK belts we haven't had a single road failure. They often last twice as long as other belts. We can count with safety on at least 50% longer life."

—H. W. Taynton Trucking,
Robert Taynton.

SHREVEPORT, La.

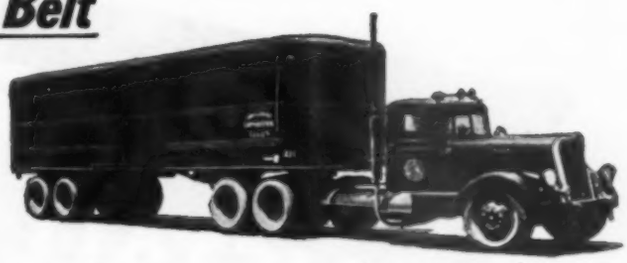
"Your specially engineered TRUCK belt has eliminated fan belt worry. It outlasts any truck belt we ever used before by one-third or more."

—Louisiana & North West Transfer Co., A. H. Semple.

"OUTLASTS ANY OTHER BELT"

Order a GATES TRUCK BELT!

Why expect a "Passenger Car" Fan Belt to Stand Up in TRUCK SERVICE?



You would never for one minute expect a passenger car tire to stand up in service on your trucks or buses. Naturally not, because you know that on trucks and buses tires have a tougher job to do—a bigger, stronger, more rugged tire is naturally needed.

And just the moment you think of the matter, you realize at once that exactly the same facts apply to belts.

A typical passenger car belt, for example, carries a 3.8 horsepower load. The belt on a regular truck must transmit 13 horsepower to turn the fan, pump and generator. In addition, trucks and buses run longer hours—often 24 hours a day. They must change speeds as many as 600 times a day with rapid acceleration, abrupt deceleration, stops, starts and idling—all of which put a strain on truck and bus belts far greater than a passenger car belt ever has to stand.

Is it any wonder that big operators by the hundreds are turning to the one belt that is specially engineered for this extra heavy service—the Gates TRUCK Belt.

The ONLY Belt Especially Made for TRUCKS and BUSES

No wonder it gives 50% to 80% LONGER WEAR

Read the letters reproduced on these pages. They tell you how practical, experienced, hard-headed operators are getting 50% to 80% longer belt wear since they began using the Gates TRUCK Belt. More important they tell you how much valuable operating time they are saving through fewer road failures and fewer delays for servicing.

If you are interested in keeping your trucks and buses operating most efficiently and economically, call your jobber today and tell him to send you a trial order of Gates TRUCK Belts.

Hundreds of BIG OPERATORS say "50% to 80% Longer Wear"

NEWARK, N. J.

"CUTS COSTS IN HALF"

"Really tough service on our milk trucks played havoc with belts until we installed Gates Specially Engineered Truck Belts. We are now using only half as many belts as before—and saving a lot of time previously spent on belt adjustment."
—Bloomingdale Dairy Co., Inc., Edwin R. Fantel, Maint. Supt.

MILWAUKEE, Wis.

"FAR SUPERIOR"

"Your specially engineered TRUCK belt is now in use on our entire fleet. It is far superior to any belt we have ever used."
—Advance Express Co., Dave Winters.

SACRAMENTO, Cal.

"We installed your Series 'T' Black Truck Belt when it was first placed on the market and it is giving approximately 90% longer service than even your pre-war belt."
—Gibson Lines, W. T. Smith, Shop Supt.

"90% LONGER SERVICE"

GATES Jobbers NOW Have Stocks to Serve You!

THIS IS A Gates PRODUCT

The GATES RUBBER CO., Denver, U. S. A.

World's Largest Makers of V-Belts

T445

BE WISE—USE CHAINS—BUT USE 'EM WISELY

Keep your vehicles free from accidents, help keep the roads open for all essential transportation. The use of tire chains during winter storms will prevent loss of time and damage to hard-to-get equipment. But chains are limited, too, so repair worn or broken chains promptly, install them properly for longer life, and replace with new ones only when necessary.

PYRENE CHAIN GUIDE

Your Pyrene jobber has a new chart for you. Ask for it. It shows your drivers and shop men how to install and conserve tire chains. Get genuine Pyrene Chains and Repair-Parts from your jobber.

Pyrene Manufacturing Company
NEWARK 8 • NEW JERSEY
ATLANTA • KANSAS CITY • CHICAGO • SAN FRANCISCO
Affiliated with C-O-TWO FIRE EQUIPMENT COMPANY

Pyrene TIRE CHAINS

DAYTON WHEELS

STRETCH PAYLOADS TWO WAYS!

RIGHT now, Dayton Spoke Type Cast Steel Wheels can help you move more payload with your present rolling stock. And with today's terrific demands on a Trucking and Bus Industry faced with a growing equipment shortage, that's an important item.

Stretch your payload like this:

1. *By cutting deadweight.* Although stronger, they weigh less; and because of the Dayton demountable rim wheels, even the weight of extra wheels is eliminated.
2. *By protecting running time.* Dayton demountable rims save time on tire changes. This protects schedules with quick roadside changes; cuts maintenance time when switching and rotating tires.

In addition, Dayton Wheels conserve tire wear with a fanning action of the spokes that air-cools tires and brake lining. Positive elimination of rim slippage and subsequent uneven wear adds up to more of the same. Specify Dayton Wheels on your new equipment . . . or for all replacements.

★ ★ ★

The Dayton Steel Foundry Co., Dayton, Ohio

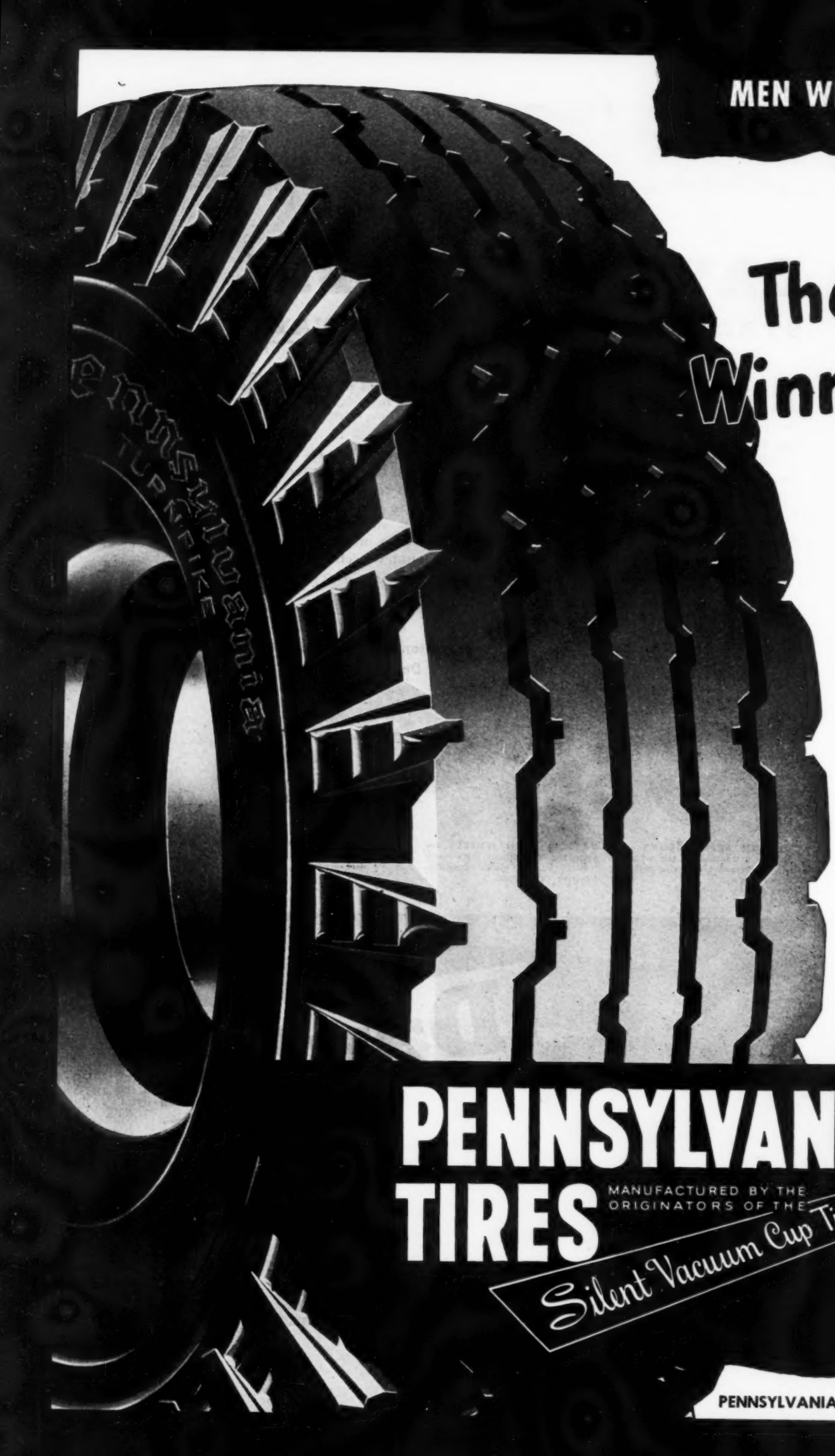
DAYTON BRAKE DRUMS — Drums assembled to the wheels at the factory give more perfect concentricity.

DAYTON FIFTH WHEELS — Standard equipment on many trailers. Provide quick coupling. Positive operation.

DAYTON LANDING GEARS — Hydraulic and mechanical.

Dayton
SPOKE TYPE CAST STEEL WHEELS
Dayton Wheels are available on any of the following: Trucks — Autocar, Federal, International-Harvester, Gramm, Mack, Studebaker and White. Trailers—Fruehauf, Trailmobile, Gramm, Kingham, Edwards and Mono. Buses — Brill, Mack, and Pullman. Specify Dayton Wheels, Brake Drums, Fifth Wheels and Landing Gears for your own trucks, trailers, buses.
★ BUY WAR BONDS AND STAMPS ★

MEN WHO KNOW TI



There's Winning It's

PENNSYLVANIA TIRES

MANUFACTURED BY THE ORIGINATORS OF THE

Silent Vacuum Cup Tire

PENNSYLVANIA RUBBER COMPA

JEANNE

W TIRES ARE SAYING . . .

an Old Name New Fame PENNSYLVANIA

From Suez to San Francisco, men who know tire performance today know you can count on PENNSYLVANIA Tires for longer wear under the toughest going. Every Pennsylvania Tire has these three long-life features, all originated by Pennsylvania engineers:

DUAL PURPOSE TREAD—Pennsylvania was the first to use the dual tread—tough, wear-resisting outer tread and cool-running inner tread. A big plus value in extra miles!

SUPER-TEST CORD CARCASS—Pennsylvania Tires have the tough, shock-absorbing Super-test Cord carcass—another reason Pennsylvania Tires are the choice of men who know tires.

SUPER PRESSURE CURING—Hailed as one of the greatest developments in tire engineering. Super Pressure Curing gives Pennsylvania Tires a more flexible carcass, greater tread density—longer life.

Ask your Pennsylvania dealer for this pocket-size Tire Manual, or write to Jeannette, Pa. for your copy.

COMPA

JEANNETTE, PA.

OLDER EQ

TOUGHER SCHEDULES-

See Your "Socony-Vacuum Representative"!

USE SOCONY-VACUUM
LUBRICANTS, FUELS
ENGINEERING SERVICE

DELVAC

Hea

QUIPMENT

ES—FEWER MECHANICS

YOUR MAINTENANCE DEPT. NEEDS ALL THE HELP IT CAN GET. Start using Socony-Vacuum Delvac Oils. These sturdy oils help cut "out-of-service" time—keep ENGINES FAR CLEANER AND SAFER BECAUSE ☛ they hold in harmless suspension impurities created by engine operation ☛ minimize formation of sludge, "lacquer" and "varnish" deposits ☛ protect hard-alloy bearings against wear, corrosion—help reduce engine cleanings, overhauls, repairs! Start saving today—get Delvac Oils!

OTHER SOCONY-VACUUM TIME-SAVERS:

MOBILUBE GEAR OILS—These highly stable, *straight mineral oils* are made specifically for heavy-duty service. Freedom from abrasives, soaps, fillers, foreign materials of any kind—will not thicken excessively when cold. Offer maximum protection against "scuffing," "galling"—dangerous gear wear!

MOBILUBE "V"—A special short fiber, soda soap grease developed primarily for wheel bearings and grease-type universal joints. Also recommended for clutch release bearings and other parts operating at high temperatures. Exceptionally efficient and long-lasting. Recommended for year-around use.

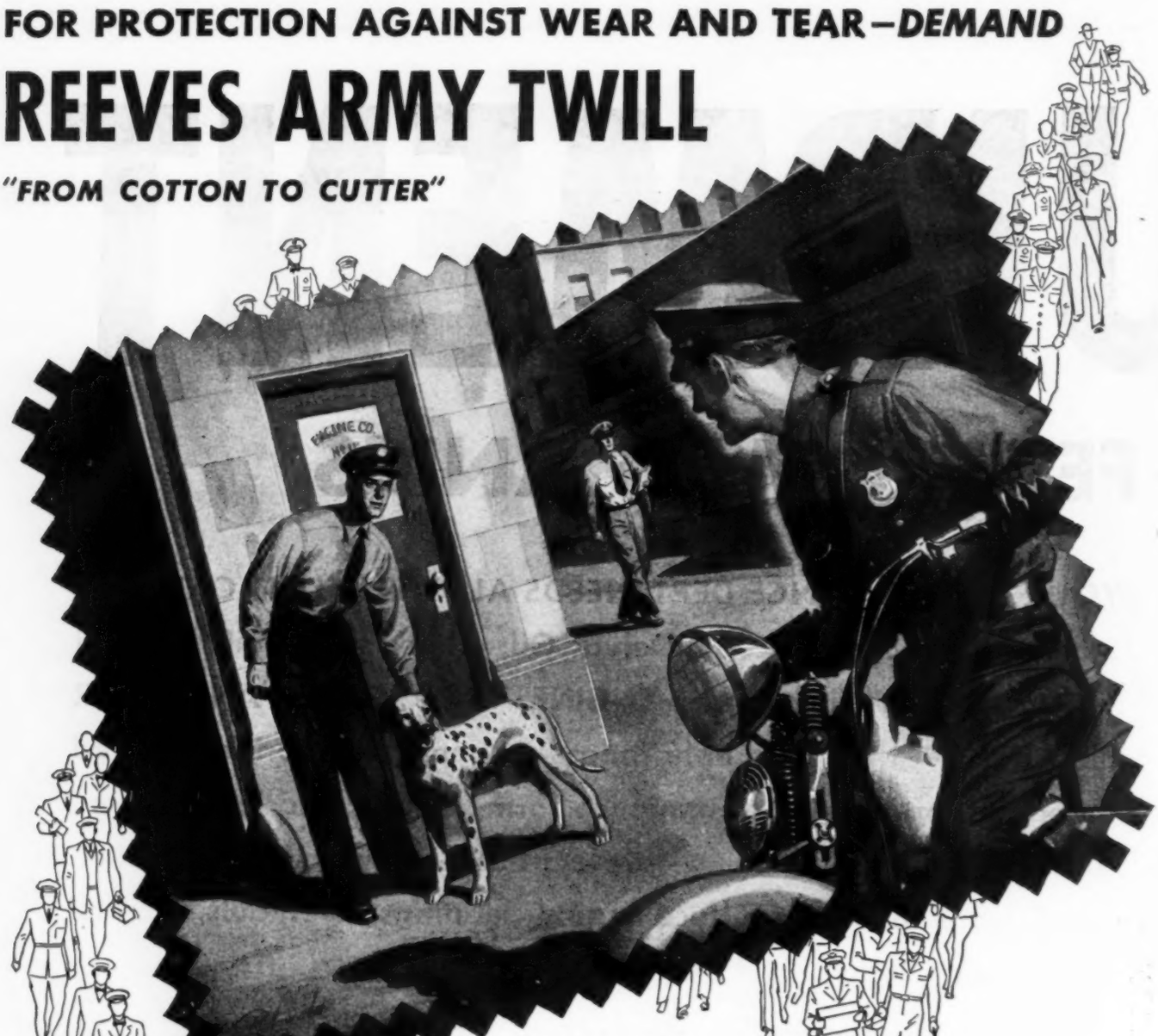
SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: Magnolia Petroleum Co.; General Petroleum Corp. of Calif.

Heavy-Duty OILS

FOR PROTECTION AGAINST WEAR AND TEAR—*DEMAND*

REEVES ARMY TWILL

"FROM COTTON TO CUTTER"



Countless public safety organizations specify *invasion-tested* Reeves Army Twill. Wherever durable, good-looking uniforms are needed, this top-quality fabric tailors smartly and gives superb service. Over 80 million yards of it have already been used to help equip America's fighting men, and it is proving itself under the toughest climatic and combat conditions of global war. This fabric, Sanforized Shrunk* and color-fast to sun, water and perspiration, will meet *your* post-war uniform needs. When the time comes to order them, choose from a wide range of popular colors, for long-lasting good looks insist on Reeves Army Twill.

**Residual shrinkage less than 1%*

THE REEVES FABRIC GROUP INCLUDES: *Reeves Army Twill • Glengarrie Poplin • Reeveking Gabardine • Byrd Cloth • Marine Herringbone • Mountain Cloth • Warrior Twill*

SPINNING • WEAVING • DYEING • FINISHING

Reeves FABRICS

Mills Mill, Greenville, S. C. and Woodruff, S. C.
Fairforest Finishing Co., Spartanburg, S. C.

REEVES BROTHERS, INC.

54 WORTH STREET • NEW YORK 13, N. Y.

Representatives in Atlanta • Boston • Chicago • Dallas • Los Angeles • Philadelphia • St. Louis • Montreal • Toronto

Congratulations

MAINTENANCE AWARD WINNERS!

- City Transportation Div. for companies operating over 1,000 buses
  CAPITAL TRANSIT COMPANY, Washington, D. C.
- City-Intercity Transportation Div. for companies operating 750-1,000 buses
  EASTERN MASSACHUSETTS ST. RAILWAY CO., Boston, Mass.
- City Transportation Div. for companies operating 250-500 buses
  SAN ANTONIO TRANSIT COMPANY, San Antonio, Texas
- City-Intercity Transportation Div. for companies operating 250-500 buses
  CONNECTICUT RAILWAY AND LIGHTING COMPANY, Bridgeport, Conn.
- City-Intercity Transportation Div. for companies operating 100-250 buses
  HARRISBURG RAILWAYS COMPANY, Harrisburg, Pa.
- Intercity Transportation Div. for companies operating 100-250 buses
  TECHE GREYHOUND LINES, New Orleans, La.
- City Transportation Div. for companies operating 50-100 buses
  MONTGOMERY CITY LINES, Montgomery, Ala.
- Intercity Transportation Div. for companies operating 50-100 buses
  BLUE RIBBON LINES, Ashland, Ky.

Champion salutes all Maintenance Award Winners on a job well done. Our heartiest congratulations!

According to authoritative statements, civilian bus and truck travel is now at double the peacetime load. The remarkable part of this picture is that it has been achieved with prewar buses and trucks in the vast percentage of vehicles registered.

This, in turn, in the face of material and manpower shortages, extra long hours and unbelievable mileages, is a magnificent tribute to the fortitude and stick-to-itiveness of the maintenance men who have "kept 'em rolling."

Champion is indeed proud that Champion Spark Plugs rank so high in the esteem of these maintenance men and is particularly proud of the part Champion Spark Plugs played in making the winning of these awards possible. We pledge to all maintenance men that in the future, as now, Champion dependability is something they can always depend upon.

CHAMPION SPARK PLUG COMPANY • TOLEDO 1, OHIO • WINDSOR, ONTARIO, CANADA • FELTHAM, ENGLAND

BUY MORE AND MORE WAR BONDS UNTIL THE DAY OF VICTORY

Champion Spark Plugs

NO JOB TOO BIG—NO WORK TOO TOUGH—for CHAMPIONS

What a Tank Operator can tell a

Any tank commander can tell you there's a MUST for every drop of oil used in Army tanks — as well as in every other Army vehicle:

It must be DETERGENT — DISPERSIVE — ANTI-CORROSIVE.

Here's why:

A DETERGENT OIL . . . helps to end sludge, gum and to clean off old deposits. A tank can't afford to have sticking valves, gummed piston rings, clogged oil lines. *Can you afford it?*

A DISPERSIVE OIL . . . washes out carbon, minimizes carbon formations. It keeps carbon particles separate, prevents them from forming in trouble-making masses, lets them drain off with every oil change. Tanks can't afford trouble from carbon... *can you?*

AN ANTI-CORROSIVE OIL . . . prevents corrosive acids from eating away copper-lead bearings. Tanks can't afford bearing failure. *Can you?*

VEEDOL 90 HEAVY DUTY

OIL IS DISPERSIVE . . . DETERGENT

. . . ANTI-CORROSIVE

ell a Truck Operator about OIL

Veedol 90 H.D. already is a big factor in the low-cost maintenance and high efficiency records being made by many large truck and bus fleets today. It can help *you* — why not give it the chance? Veedol 90 H.D. comes in S.A.E. 10 to 50. Write today for full information and prices.

THE FAMOUS VEEDOL P. M. PLAN IS WAITING FOR YOU, TOO!

The Veedol Preventive Maintenance Plan is doing a whale of a job for over 800 hard working fleets. It can help yours. The plan can be tailored to fit any number of units—and costs only 18¢ per truck. Write today for a Tide Water representative to call and go over this *proven* lifeguard for rolling equipment. You can't get started any too soon!

TIDE WATER ASSOCIATED OIL COMPANY
New York 4, 17 Battery Place
Tulsa 2, Thompson Bldg.

VEEDOL OILS AND GREASES

VEEDOL MOTOR OIL

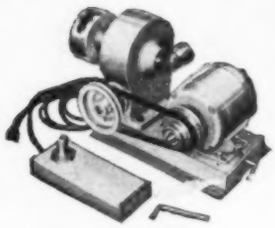
BUY AT LEAST *ONE* EXTRA $100 WAR BOND!

MANUFACTURERS OF FINE TOOLS AND EQUIPMENT FOR OVER 30 YEARS

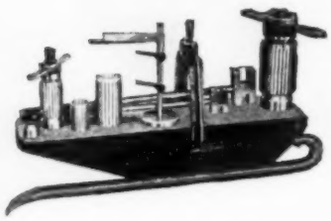
A. C. Arc Welders
20 to 275 Amps.

Dual A. C. Arc Welders . .
20 to 550 Amps.

Valve Seat Grinders

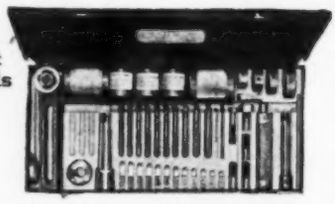


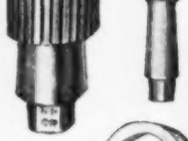
Reamer Drives



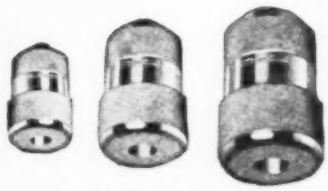
Connecting Rod Aligners

Valve Seat Insert Tools





Expanding Mandrels



Drill Chucks

Valve Seat Rings

SIGNS OF THE TIME
—ARE SIGNS FOR THE FUTURE

More miles, more service is expected today—more so than ever before. Regardless of age or condition, vital transportation must be given more service and conditioning . . . they must be kept rolling!

A satisfied customer is the greatest asset your business can have. Satisfied customers are made with fine tools and equipment . . . reputation is made by ultimate performance.

Equip today the K-O Way!
Write for literature on any or all *Knock-Out* Products.

K. O. LEE COMPANY
ABERDEEN, SOUTH DAKOTA

IF IT'S MADE BY LEE IT'S A KNOCK-OUT!

FEDERALS HAVE WON

By Costing Less to Run!

INCLUDED in Federal's important lists of fleet owners and operators are hundreds of municipalities, states and governments throughout the world. Since 1910 . . . Federal trucks have been known in every country and sold on every continent.

Federal trucks serve in road building, highway maintenance, bus transportation, street cleaning, waste disposal, construction work, material handling, and hundreds of other essential public works projects. By offering more powerful, heavier duty units in a broader range of *usable* models, Federal has taken the guess work out of truck buying—has established an enviable record of operating economy and dependability.

For the past five years Federal has produced millions of dollars worth of big, powerful, extra duty trucks for the Armed Services—now is authorized to build a limited number of standard units for essential civil and civilian needs. Your Federal dealer will help you! Consult him—or write the factory!

FEDERAL MOTOR TRUCK COMPANY
DETROIT 9, MICHIGAN

CONSERVE YOUR TRUCKS

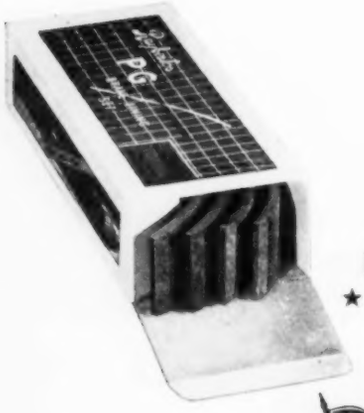
It's more than good common sense—it's our patriotic duty to keep America's trucks rolling for Victory! Periodic check-ups help keep repair bills down.

FEDERAL TRUCKS

Since 1910 — Known in Every Country — Sold on Every Continent

THIS IS PROGRESS

From making the first brake to stop a car going backward, to production of a brake block to stop a 30 ton bomber, Raybestos has kept progressively ahead—winning universal consumer acceptance by assuring the exactly right friction material for every make, model and job. ★ Tomorrow the application to civilian use of Raybestos' war-born advanced friction materials, such as the remarkable "1492" bomber brake block, will provide you with still finer brake linings and clutch facings. ★ It pays in dollars and cents to make Raybestos your choice.



THE RAYBESTOS DIVISION of *Raybestos-Manhattan, Inc.*, BRIDGEPORT, CONN.

INVEST IN AMERICA
BUY BONDS

ARMY E NAVY

Raybestos

AMERICA'S BIGGEST SELLING

BRAKE LINING

BRAKE LININGS, CLUTCH FACINGS, FAN BELTS, HOSE FOR CARS, TRUCKS, BUSES, TRACTORS ON THE WAR AND CIVILIAN FRONTS

Please mention FLEET OWNER *when writing to advertisers.*

THE hum of a heavy truck on a highway—the purr of a bus and the whir of a car—are behind the deep bass roar of American industrial might. Factory wheels spin only because materials and manpower reach the job safely, and on time. Transportation is vital, calling for utmost reliability of equipment.

Packard cable carries the current in a majority of these vehicles. Packard cable has been the original equipment choice on cars, trucks and buses ever since the beginning of the automotive industry. Leading garages, car dealers and service stations recommend Packard cable as the best replacement choice. Packard is favored because its reputation has been built by finest performance under severest operating conditions.

More aviation cable, for instance, is made by Packard than by any other manufacturer. Fighter and bomber planes are sparked by current that travels through Packard cable. Tanks, landing craft, gun-control apparatus, Army "ducks" and half-tracks, radio equipment and many other war weapons have Packard cable. . . . You're *right* in choosing Packard cable when you replace spark plug wires, battery cables and lighting cable. Packard is the leading choice in keeping essential transportation rolling.

GOOD WIRING MEANS LONG-LASTING ELECTRICAL EQUIPMENT

PACKARD CERTIFIED RE-WIRING SERVICE

Based on proper checking and replacement procedure, using Packard cable.

Ask your Packard jobber about it.

We Can't Let Up for a Moment

Keep Buying Bonds

Packard

REG. U.S. PAT. OFF.

PACKARD ELECTRIC DIVISION
GENERAL MOTORS CORPORATION
WARREN, OHIO

FOREMOST BUILDER OF AUTOMOTIVE AND AVIATION WIRING

TOOLS FOR *today's* JOB

36 PIECE MULTI-DUTY
WRENCH SET NO. 6036

The word Maintenance has become—in wartime—much more significant than a mere description of your preventive service operations. In hundreds of thousands of cases it has meant no less than life or death to some vital motor. For, with replacements just unobtainable, existing vehicles must go the route, or else! Obviously, this stubborn fact has placed new values on Tools and a heavy responsibility on those who use them to keep today's critical vehicles in repair and on the move.

New Britain has the Tools for this job today. The procedure is well established which enables you men who need Tools to get them. On Tool Kits, such as the superbly balanced Set shown here, we can accept an order, through your NAPA Jobber, provided the name of the mechanic as the user is on the order. These and many other money-making New Britain Tools are available to you now. Our Tool Availability Lists tell you exactly—What, How and When. Ask your NAPA Jobber to show you one of these Lists today! The New Britain Machine Co., New Britain, Conn.

N·A·P·A
National Automotive Parts Association
Assurance of Quality

The complete New Britain Line for Automotive, Aircraft, General Maintenance & Production Needs is sold by leading Jobbers.

ARMY E NAVY

The Army-Navy "E" Pennant, with stars, flies over New Britain's plants, signalizing outstanding production of machine tools, aircraft engine parts and projectiles.

New Britain

THE NEW BRITAIN MACHINE CO. **HAND TOOLS**

TYPICAL DIESEL LUBRICATION PROBLEMS:

5. Liner Wear

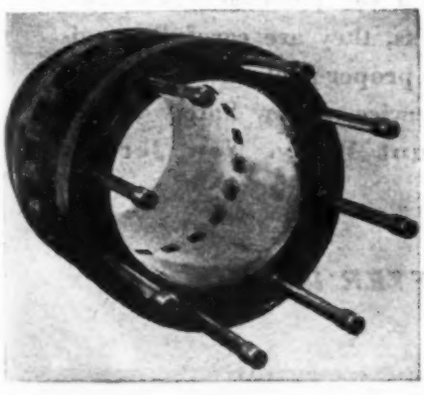
Wear on Diesel liners is commonly concentrated in the high-temperature belt near the combustion chamber. This is largely attributable to the inherent inability of most lubricating oils to "wet" hot metal surfaces.

Unlike spark ignition engines in which a partial vacuum in the combustion space during the intake stroke assists in drawing oil toward the upper compression rings, Diesels operate at or above atmospheric pressure in the combustion space which tends to drive oil away from the rings.

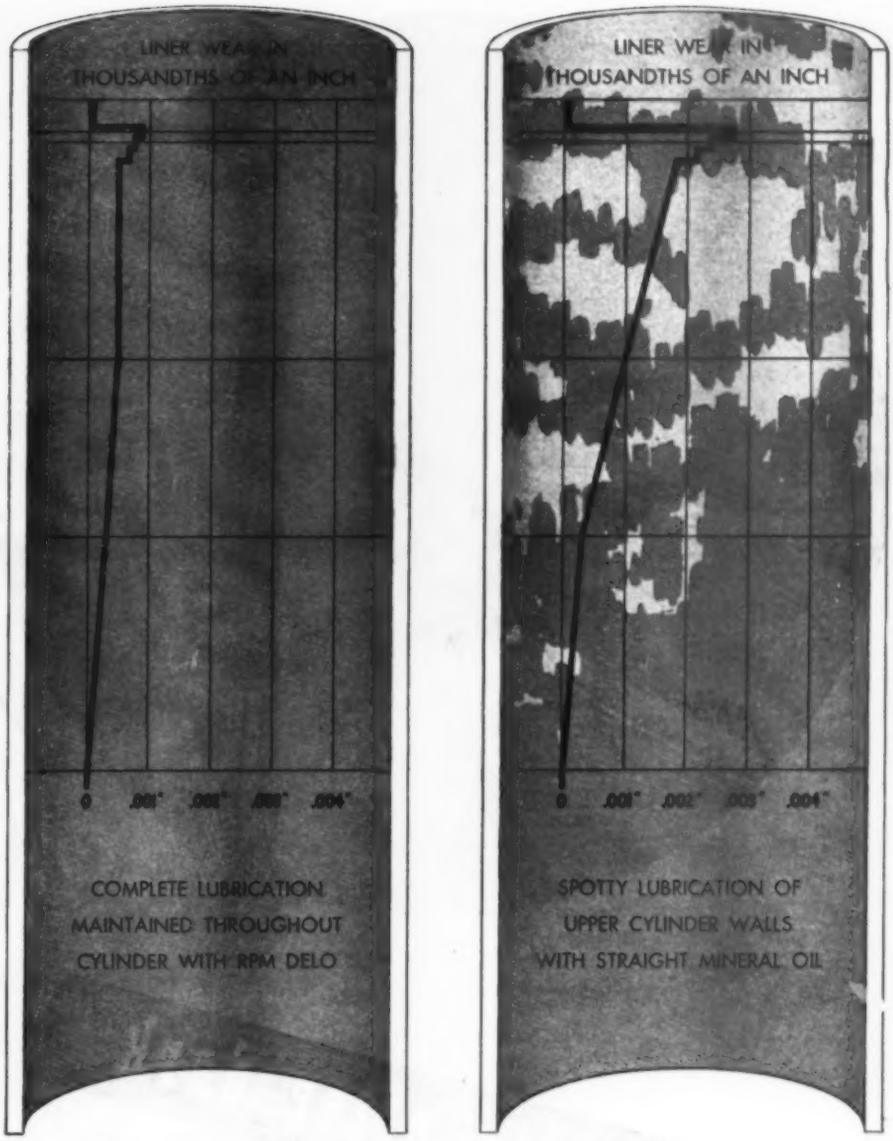
It is imperative then—to prevent relatively dry operation in the top piston ring high-temperature area—for the lubricant to have high-temperature adhesion characteristics.

To achieve this high adhesion factor under all operating conditions in RPM DELO Diesel Engine Lubricating Oil, a special compounding material was added. With this additive, RPM DELO will not run away from hot surfaces, thus preventing metal-to-metal contact on hot-running engine parts.

A typical example of the effectiveness of RPM DELO in preventing liner wear is offered by the Chicago, Rock Island and Pacific Railroad. One of its "Rocket" Diesel powered locomotives ran 157,076 miles on RPM DELO without an oil change, with liner wear of only .001 in.



Liner from Rock Island "Rocket" engine showing wear of only .001 in. after 157,076 miles on RPM DELO without an oil change.


LINER WEAR IN THOUSANDTHS OF AN INCH
0 .001" .002" .003" .004"
COMPLETE LUBRICATION MAINTAINED THROUGHOUT CYLINDER WITH RPM DELO
LINER WEAR IN THOUSANDTHS OF AN INCH
0 .001" .002" .003" .004"
SPOTTY LUBRICATION OF UPPER CYLINDER WALLS WITH STRAIGHT MINERAL OIL

These charts of one of the tests required by the Army in certifying oil for use in combat equipment, graphically illustrate (right) marked increase of liner wear in upper cylinder zone due to inability of straight mineral oil to provide full lubrication of this high-temperature area; and (left) reduction of liner wear by ability of RPM DELO to stick to these hot spots.

Other causes of liner wear minimized by RPM DELO include:

1. Corrosion caused by carbonic and other acids at low temperatures.
2. Scuffing of liners from rocking of piston rings in worn grooves.
3. Scoring and scratching of liners due to stuck piston rings.

Reducing liner wear to a remarkable degree is but one of RPM DELO's advantages in solving Diesel engine maintenance problems. Its other properties include: The ability of RPM DELO to eliminate ring sticking, to stop excessive deposits on rings and ports, and to prevent bearing corrosion.

RPM DELO has world-wide distribution and is marketed under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial RPM DELO (concentrate). Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity.

RPM DELO

Write on your letterhead for free booklet on RPM DELO, *Standard of California, Dept. T-12, San Francisco, California*

STANDARD OF CALIFORNIA

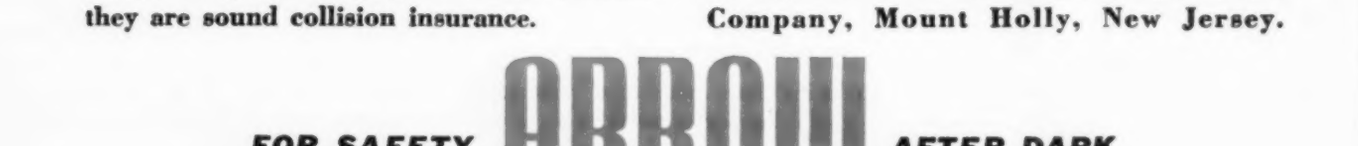
Safety after dark

There is nothing new about rear-end collisions. Even the old wood-burners had their troubles in this respect and stop-lights were set-up at intervals along the right-of-way to reduce the hazard.

Heavy vehicular traffic on today's highways requires dependable lighting protection, too. Large, easily-seen stop-lights cost so little and they are sound collision insurance.

Arrow offers a complete line of practical stop-lights from the large 6-inch-in-diameter flush type, preferred by bus and fleet operators, to the combination tail and stop-lights especially designed for passenger-cars. Like all Arrow products, they are carefully engineered to provide proper protection and years of dependable service. Arrow Safety Device Company, Mount Holly, New Jersey.

FOR SAFETY ARROW AFTER DARK



The right American Brakeblok heavy duty brake lining *conserves trucks and tires*

Good brakes help drivers do a top job of truck and tire conservation. The right American Brakeblok heavy duty brake lining increases the safety factor of brakes and lowers maintenance cost.

For efficient brake operation American Brakeblok engineers developed three specialized heavy duty brake linings, tested not only in a scientific laboratory but by thousands of miles operating experience in every State in the Union.

If you have brake lining problems, take advantage of our research division, use the FREE Advisory Service. Write

American Brakeblok Division, Detroit 9, Mich.

FREE ADVISORY SERVICE

brings helpful information promptly on your individual brake problems.

Master stocks in 38 NAPA warehouses. Jobbers everywhere give prompt service.

1 American Brakeblok "Regular" Brake Lining for manually operated braking systems.

2 American Brakeblok "1000 Series" Brake Lining for vacuum-booster braking systems.

3 American Brakeblok "2000 Series" and thick blocks for air brake equipment.

American Brakeblok

BRAKE LINING

TRADE MARK REG. U.S. PAT. OFF.

DIVISION OF AMERICAN Brake Shoe COMPANY

ENGINE LIFE

Depends on Absolutely DEPENDABLE Lubrication

HERE'S THE ANSWER!

D-X *Heavy Duty* MOTOR OIL

FOR MORE PAY-LOAD MILES

You can depend on this superior oil for clean engines... safety for all metal surfaces and moving parts... free rings... top performance in most severe service ... the minimum in repair and overhaul. Economical... you get more pay-load miles! Available in SAE grades 10 to 50.

★ ★ ★

For Light Trucks, Commercial Cars

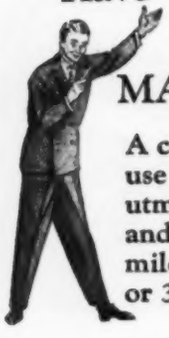
DIAMOND 760 MOTOR OIL

For All Diesel Engines

D-X DIESEL MOTOR OIL

★ ★ ★

Have You Investigated the D-X PREVENTIVE MAINTENANCE PLAN



A complete, yet simple and easy-to-use plan to help you obtain the utmost in trouble-free operation and engine life at lowest cost per mile... whether you have 3 trucks or 300. Necessary forms supplied.

Look At These Advantages:

Solvent Processed • Detergent-Type
Highly Dispersive • Resistant to Oxidation
Heat and Friction Resisting
Superior Quality • Easier Starting

Money-Back Guarantee

Write or phone nearest D-X office

MID-CONTINENT PETROLEUM CORPORATION

CHICAGO OMAHA TULSA TERRE HAUTE WATERLOO

New Hydraulic Control for Trucks and Busses

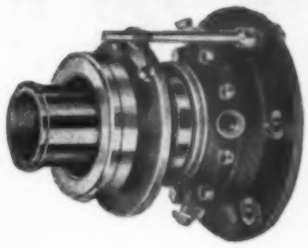
In heavy-duty operation such as illustrated, the Hydrolease will offer particularly important advantages.

Here's a remarkable new hydraulic development revolutionizing operation of clutch throw-out mechanisms in heavy-duty motor vehicles.

The PESCO *Hydrolease*, a hydraulic clutch actuator, brings the smooth, positive force of hydraulics to clutch control. It materially reduces clutch pedal load, easing operation and strain on both driver and vehicle. It makes clutch pedal action more accurate, reduces wear and maintenance on the clutch, and eliminates many mechanical parts.

The PESCO *Hydrolease* has been thoroughly tested in the laboratory and *on the road*. It's ready for specification now. Write for full details. PESCO Products Co., Automotive Division H, 11610 Euclid Ave., Cleveland 6, Ohio.

PESCO HYDROLEASE



IMPORTANT ADVANTAGES

1. New ease and smoothness in clutch operation. Clutch response is more accurate. Eliminates "creeper gear jerk".
2. Lightened clutch pedal load, approximately 50 per cent less.
3. Constantly adjusted clutch clearance between the clutch release bearing and the clutch throw-out mechanism. Saves clutch plate linings.
4. Reduced weight, reduced number of working parts, reduced maintenance cost.
5. On one typical bus installation the PESCO *Hydrolease* eliminates 42 working parts, 19 points of lubrication . . . and its cost, 60 per cent less.

In Precision Hydraulics, Fuel Pumps, Air Pumps, Related Accessories . . .

PERFORMANCE POINTS TO Pesco FIRST

KELLY-GRAMS

DON'T SLAM ON THE BRAKES AT THE LAST POSSIBLE SECOND—SLOW DOWN—EASE UP—SAVE THAT RUBBER!

DON'T PERMIT SPOTTY WEAR

IT'S A SURE SIGN OF SOME MECHANICAL TROUBLE—UNEVEN BRAKES, DRUMS OUT OF ROUND, UNEVENLY APPLIED RIMS, WORN SPINDLES OR BUSHINGS, ETC. WITH TRUCK TIRES SO TOUGH TO GET, IT IS REALLY ESSENTIAL TO CARE FOR THOSE YOU HAVE—EVEN THOUGH TIME IS MONEY AND LABOR IS SCARCE EXTRA ATTENTION IS A WORTH-WHILE ECONOMY.

"A Word to the Wise"

TRUCK TIRES MADE UNDER PRESENT SPECIFICATIONS REQUIRE EVEN MORE CARE THAN THOSE YOU WOULD HAVE USED IN THE PAST. INFLATION MUST BE MAINTAINED. LOADS AND SPEEDS MUST BE HELD DOWN TO RECOMMENDED MAXIMUMS.

YOUR KELLY TIRE DEALER CAN BE OF REAL HELP IN KEEPING TRUCKS IN OPERATION. ALSO, YOU'LL FIND KELLY'S LONG EXPERIENCE AND RIGID HIGH STANDARDS OF WORKMANSHIP STILL PAY OFF IN MORE DEPENDABLE TIRE PERFORMANCE!

Kellys are Tough!

KELLY *Springfield* **TIRES**

DEPEND ON THE KELLY DEALER FOR EXPERT REPAIRS, RECAPS AND INSPECTION!

THE KELLY-SPRINGFIELD TIRE COMPANY, CUMBERLAND, MD.

"PLUG-CHEK... helps us get at the heart of spark plug trouble"

Says R. H. LINAM
Central Freight Lines, Inc.
Waco, Texas

"YOUR 'Plug-Chek' helps our mechanics in preventing engine failures due to spark plug trouble by getting at the heart of that trouble," explains Mr. Linam. "We operate a large fleet of trucks . . . often far away from our maintenance depots. The information provided by the 'Plug-Chek' Indicator, and ably interpreted by the Data Book, greatly aids us in insuring prompt delivery of important merchandise to an anxious consumer."

Auto-Lite invites you to find out for yourself how "Plug-Chek" can help you eliminate trouble and cut fleet maintenance expense. Write for your FREE "Plug-Chek" Inspection Service Kit today.

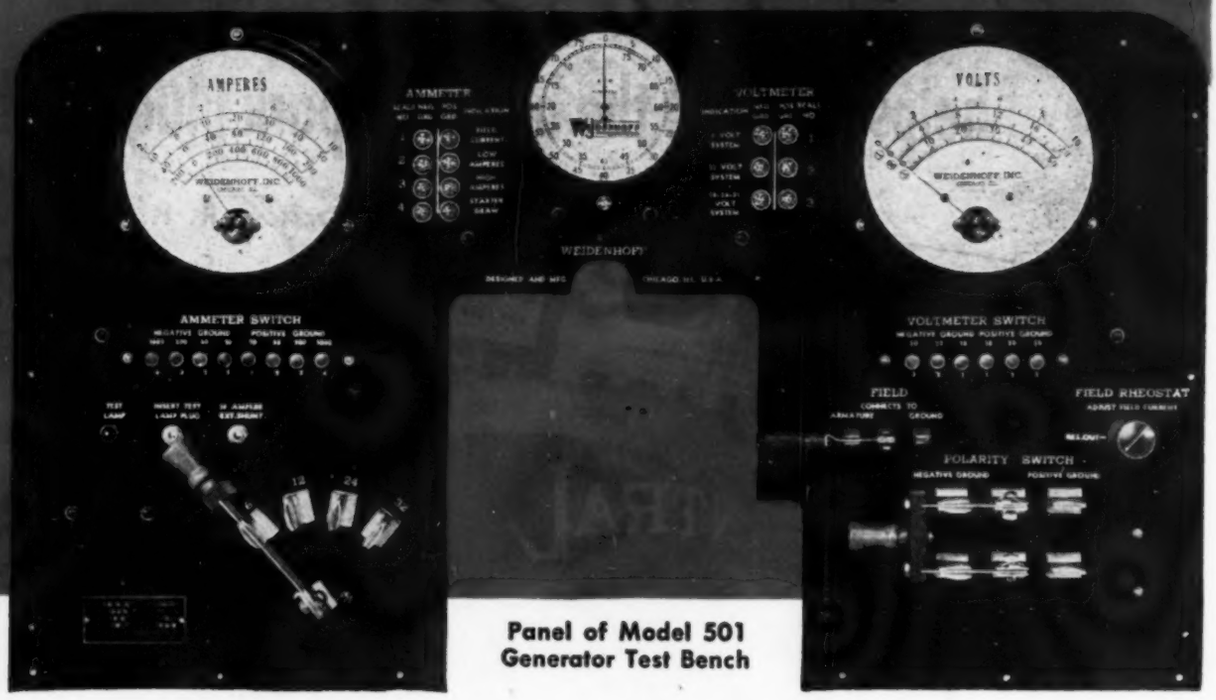
TOLEDO, 1, OHIO **THE ELECTRIC AUTO-LITE COMPANY** SARNIA, ONTARIO
Merchandising Division

TUNE IN "EVERYTHING FOR THE BOYS" STARRING DICK HAYMES — EVERY TUESDAY NIGHT — NBC NETWORK

AUTO-LITE SPARK PLUGS
IGNITION ENGINEERED BY IGNITION ENGINEERS

Precision Control

FEATURES WEIDENHOFF TEST BENCHES

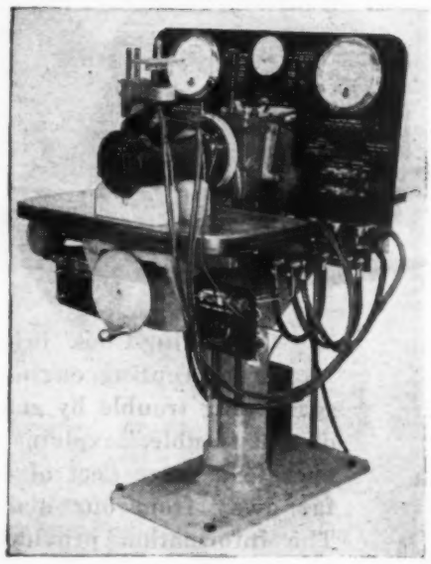


Panel of Model 501 Generator Test Bench

● The operator of a Weidenhoff Test Bench has at his finger tips a conveniently arranged observation and control panel with meters, switch, controls and indicating instruments easy to see, to use and to understand.

● On the Model 501, for example, the circuit under test is indicated by one of the red or green signal lights working in conjunction with push button circuit selector switches. Simply push the button. If polarity is reversed, as indicated by meter—just push the other button. No need to change connections to generator.

● The comprehensive instrument panel is one of many exclusive features, which combined, make Weidenhoff Test Benches universally popular and profitable for servicing modern generators, regulators and starting motors. Full information available.



MODEL 501 Generator Test Bench

ENGINE ANALYZERS • BATTERY CHARGERS • MAGNETO TESTERS

JOSEPH WEIDENHOFF, INC.

CHICAGO 24, ILLINOIS

TEST BENCHES • ELECTRICAL TESTING AND SERVICE EQUIPMENT

AUTOMOTIVE SERVICE WEIDENHOFF EQUIPMENT AVIATION

PROOF . . .
OF PEAK PERFORMANCE BY CLE-AIR SPRING CONTROL UNITS

OSHKOSH CITY LINES, INC.

60 LIGHT STREET TELEPHONE 1077 · OSHKOSH, WISCONSIN

J. T. PUTNEY, PRESIDENT
F. S. PUTNEY, SECY.-TREAS.

September 29, 1944

Mr. H. A. Lantz, Sales Manager
The Cleveland Pneumatic Tool Company
3781 East 77th Street
Cleveland 5, Ohio

Dear Sir:

One of the greatest mysteries in our past ten years has been shock absorbers -- and expensive too. And to work on them -- that is another story.

Now, we think we have solved this problem .....
First, your CLE AIR Shocks. Second, a spare set and every 10,000 miles off they come and it's only a ten minute job. Another ten minutes and the old ones are cleaned, the few drops of oil necessary installed -- where it can properly be done -- on the bench, and we are ready for the next one.

One hundred thousand miles is not far in these days of global distances, but I would not want to push a peanut with my nose that far. And to date they have gone 100,000 miles and about fifteen cents cost for oil.

Perhaps secondary is the better riding by a d---sight. And springs -- not one broken leaf since these shocks have been installed. That is why they are now standard on all for corners of our coaches.

Why do we gush like a school girl? Because - just the shocks and second a darn smart organization to do business with.

Very truly yours,
OSHKOSH CITY LINES, INC.
BY Jay T Putney
PRESIDENT

LONG LIFE

SMOOTH RIDING

View of a Cle-Air equipped bus, part of Oshkosh City Lines fleet.

Cle-Air Spring Control Units can give this same remarkable performance on your fleet. Write for information.

THE CLEVELAND PNEUMATIC TOOL CO.
AUTOMOTIVE DIVISION **CLEVELAND 5, OHIO**

NOTE:
For 2 consecutiv
years, Oshkosh Ci
Lines, Inc., won th
Bus Transportatio
National Maint
nance Award f
cities of their siz

WARD LaFRANCE TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC.

ELMIRA NEW YORK

MEMORANDUM TO THE ADVERTISING AGENCY

FROM: A. Ward LaFrance, Vice President
Great American Industries, Inc.

SUBJECT: WARD LA FRANCE TRUCKS FOR FLEET OWNERS

As you know, there are some interesting, perhaps revolutionary, ideas under development here at our Elmira plant, and I know you can't wait to tell prospective users about them. That is understandable. But please keep this clearly in mind:

Motor truck fleet owners are practical people. They are badly in need of replacement vehicles, and they are interested in the proved ideas which can be incorporated in trucks We have some fundamentally important things to tell these gentlemen, so let's not waste paper on gaudy promises and fanciful pictures of beautiful, streamlined dreams of postwar models.

Let's try to get the fact across that Ward LaFrance trucks have a twenty-five year reputation for being good trucks. Let's admit frankly that Army Ordnance engineers have increased our know-how and made it possible for us to build still better ones after the last M-1 Heavy Wrecker has been delivered.

Fleet owners should be particularly interested in our new policy of concentration on their needs. This is of great importance because it will enable us to engineer and build vehicles to their exact needs. Fleet owners will recognize that this policy will result in a truck which will out-perform and outlive standard production models in a great majority of cases. Chances are, however, people will assume such trucks will cost too much. If you people in the agency can persuade fleet owners to get the facts from our engineering staff, that is all we ask of you. We can demonstrate clearly the fundamental economy of the new Ward LaFrance policy to any fleet owner's satisfaction.

A. Ward LaFrance

A. Ward LaFrance.

GREAT AMERICAN INDUSTRIES, INC., GENERAL OFFICES, MERIDEN, CONNECTICUT
DIVISIONS
CONNECTICUT TELEPHONE & ELECTRIC DIVISION, MERIDEN, CONNECTICUT
WARD LaFRANCE TRUCK DIVISION, ELMIRA, N. Y.—FACTORY BRANCH, 139TH ST. & EASTERN BLVD., NEW YORK
VIRGINIA RUBATEX DIVISION, BEDFORD, VIRGINIA
RUTLAND ELECTRIC PRODUCTS DIVISION, RUTLAND, VERMONT

AVAILABLE THROUGH YOUR AC WHOLESALER

PROTECTION
FOR THE HEART OF THE FUEL SYSTEM

You get reliable performance and long life from your AC Fuel Pumps because *the quality is built in,* from blueprints to finished products. You will best protect that performance and durability if you install AC Authorized Factory Rebuilt Pumps (when replacement is necessary), or rebuild your present pumps with AC Diaphragm or Parts Kits.

8 REASONS WHY AC PUMPS AND PARTS ARE SAFEST

- ★Careful control of pressure and flow assuring correct fuel supply.
- ★Accurate hardening, precision machining of parts essential to long life.
- ★Accurate control of spring tensions and temper.
- ★High, and controlled, pin hardness.
- ★4-layer, patented-impregnation diaphragms of special airplane cloth.
- ★Carefully finished rocker arm pads, located to center on cam.
- ★Split-hair rocker arm clearance and control of pad hardness.
- ★Uniform pull rod hardness at pin holes.

AC FUEL PUMPS

SEND FOR AC SHOP MANUALS

Field Service Department, AC Spark Plug Division, G. M. Corp.
910 Union Industrial Building, Flint, 3, Michigan FO-12

Gentlemen: Please send at once, no charge, the AC Shop Manuals checked:

- ☐ How to Service Spark Plugs
- ☐ How to Service Spark Plug Cleaner
- ☐ How to Service Oil Filters
- ☐ HOW TO SERVICE FUEL PUMPS
- ☐ How to Service Air Cleaners
- ☐ How to Service Speedometers
- ☐ How to Service Ammeters and other Instruments

NAME_____

FIRM_____

STREET ADDRESS_____

CITY_____ STATE_____

THIS IS WHAT HAPPENS WHEN YOU WASH A TRUCK

Correctly cleaning a truck is no simple operation... these elements must go into action...

Wetting Action *(WA)* must lower surface and interfacial tensions and allow the cleaning solution to penetrate to surface of the base. Emulsifying Action *(EA)* must disperse grease and oil as tiny globules, and by suspension prevent redeposition. Saponifying Value *(SV)* must convert organic fats and oils into soluble soaps, and Solvent Action *(SA)* put soils into solution. Colloidal Activity *(CA)* must disperse solid soils into minute particles which may then be easily removed. Water Conditioning *(WC)* removes or controls the elements which cause water hardness.

Correct Buffer Index *(BI)* assures ability to absorb either alkaline or acid soil, thus prolonging efficiency of the solution. Proper *pH* assures the correct measure of energy of alkalinity and Total Alkalinity *(TA)* must supply maximum active cleaning energy.

In formulating a cleaning compound, therefore, it is obvious that no one factor is a magic key to all problems. The answer is in determining the relative value of *all* these factors as they apply to *your* problem.

Putting these factors into correct balance is a responsibility you can entrust to Turco chemists—a responsibility for which their two decades of Research and Experience *(RE)* have well qualified them. *Take your problem to Turco.*

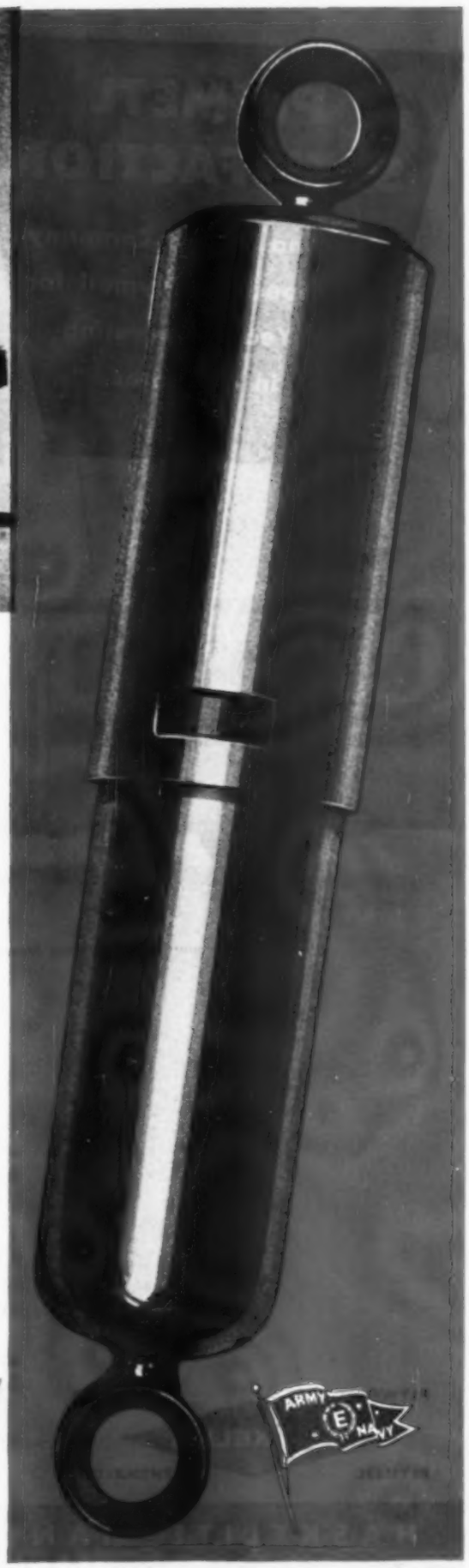
For a fuller explanation of these vital factors, write for Turco's Booklet on your firm letterhead, please.

TURCO

INDUSTRIAL CHEMICAL COMPOUNDS

TURCO PRODUCTS, INC. *Main Office and Factory*: 6135 S. Central Ave., Los Angeles 1, Calif. • *Southern Factory*: 1606 Henderson St., Houston 1, Texas • *Chicago Office and Factory*: 125 West 46th Street, Chicago 9 • *Offices and Warehouses in All Principal Cities*

THE ONLY "TRIPLE-ACTION" HYDRAULIC SHOCK ABSORBER



Look To MONROE

● Monroe Hydraulic Shock Absorbers *went into* this war with a great record of performance on leading makes of trucks, buses and motor cars. Monroe Hydraulic Shock Absorbers will *come out of* this war with the most amazing record of performance in the history of shock absorbing devices.

Monroe Hydraulics have absorbed all the shocks of war, on thousands of war vehicles. The only "triple-action" hydraulics, with the exclusive, patented "middle-zone-control," Monroes are also the only shock absorbers to be adopted as standard on General Sherman Tanks.

For more advanced performance in the control of road shocks; for economy of maintenance; safety to cargo and passengers on wartime or postwar equipment, LOOK TO MONROE! Our engineers will gladly consult with you, if you write.

MONROE

MONROE AUTO EQUIPMENT CO., MONROE, MICH.

The Only Shock Absorbers Adopted as Standard for a United States Army Tank

PLYMETL SATISFACTION

National Biscuit Company Has Specified Plymetl for 16 Years, Operating in 48 States

NATIONAL BISCUIT COMPANY

449 West Fourteenth Street, New York
Telephone: CHelsea 3-8000

February 4, 1944

Haskelite Manufacturing Corporation,
701 Ann St., N. W.
Grand Rapids 2, Mich.

Gentlemen:

We have specified metal faced plywood panels to be used on our motor trucks for the past sixteen years. Our reasons for specifying metal faced plywood panels for repairs and new motor trucks is that they are very durable. They do not wave or buckle giving the painted surface the best possible appearance.

Whenever your Plymetl panels have been used in our fleet of 1600 trucks, operating in 48 states, we have found them to be satisfactory in every respect.

Yours very truly,

NATIONAL BISCUIT COMPANY,
Sales Department.

Motor Division.

Photograph by courtesy of National Biscuit Company.

Outstanding Plymetl service earns its own warm recognition. Once used, its performance record has caused many fleet owners to specify its application to every truck installation possible.... including body panelling, doors, tailgates, and inside lining.

The National Biscuit Company truck shown above must withstand all sorts of climatic and road conditions. As a mobile advertisement for a famous food producer, it must always present the best possible appearance.

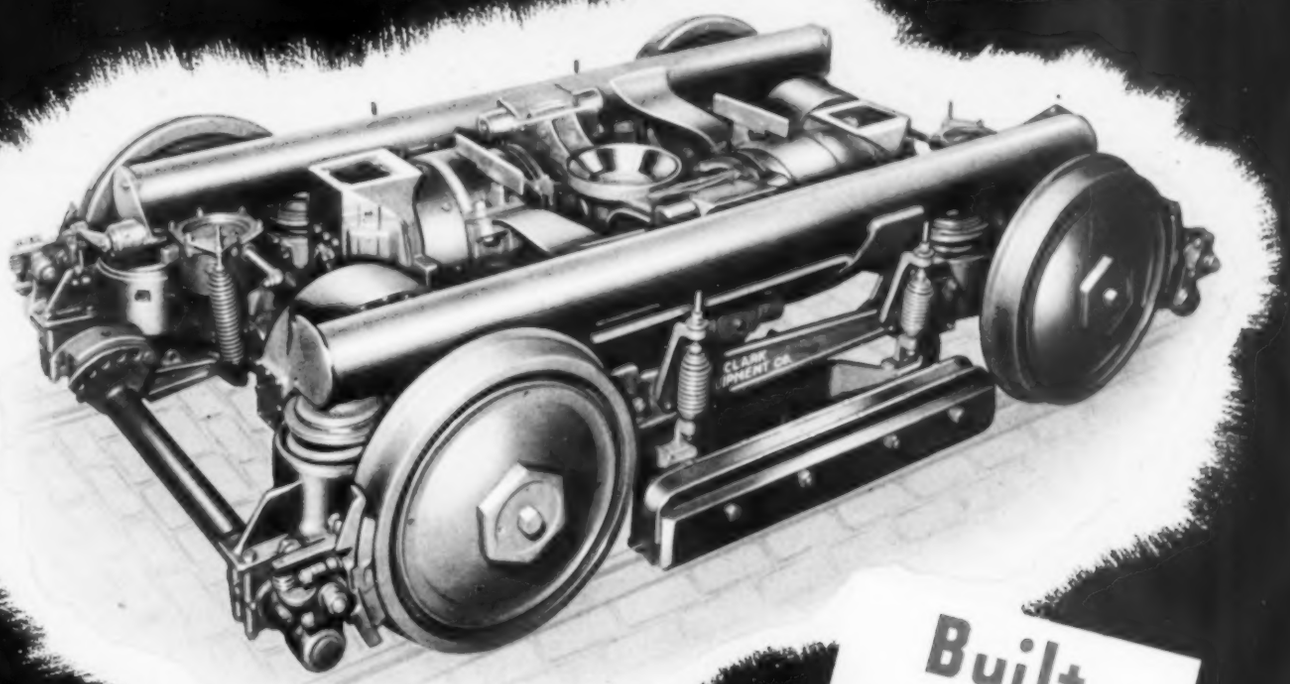
Safer and more economic operation is reported by fleet owners using bodies built of Plymetl. *Specify Plymetl to your body manufacturer when ordering your new trucks.*

Write today for more details on Plymetl truck panelling. Full information on many different applications. Address Automotive Division No. 2.

PLYWOOD PLYMOLD
HASKELITE
PLYMETL PHEMALOID

HASKELITE MANUFACTURING CORPORATION
GRAND RAPIDS 2, MICHIGAN
NEW YORK • DETROIT • CHICAGO • ST. LOUIS
In Canada: Railway Power and Engineering Corp., Ltd.

CLARK *Silent* STREET RAILWAY TRUCK



Built to do a BETTER JOB

RUBBER CUSHIONED THROUGHOUT THE TRUCK AND IN THE WHEELS—A SILENT SMOOTH-RIDING CAR . . . HYPOID GEARING ELIMINATES THE GEAR NOISE COMMON TO CARS OF CONVENTIONAL TYPE . . . PRECISION BUILT, WITH FULL INTERCHANGEABILITY OF ALL PARTS . . . NOW IN USE UNDER MORE THAN 2400 NEW STREAMLINED CARS OPERATING IN 16 LEADING CITIES OF THE UNITED STATES AND CANADA.

Another PRODUCT of CLARK EQUIPMENT COMPANY

TURN PAGE FOR MORE DATA

THIS CLARK TRUCK REVOLUTIONIZING STREET RAILWAY TRANSPORTATION

Only from the people who ride on them and from the men who operate them can a true measure be had of the brilliant success won by Clark Silent Electric Railway Trucks. A social success—for people prefer the quiet smoothness of Clark-equipped cars; and a business success, for their advantages are attractively written in bigger revenues and lower costs.

Out of studies made by the electric railway Presidents' Conference Committee came the P.C.C. car—and its remarkable trucks built by Clark; equipped with silent hypoid gearing, with rubber insulated wheels, with all its parts interchangable.

Under more than 2,200 swift streamlined cars in 16 major cities, these trucks tend silently, smoothly to their job—smart modern tributes to patient, painstaking engineering and precision manufacture.

Another PRODUCT of CLARK EQUIPMENT COMPANY

CLARK EQUIPMENT COMPANY
RAILWAY DIVISION, BATTLE CREEK, MICHIGAN
Also BUCHANAN . . . JACKSON . . . BERRIEN SPRINGS, MICH.

CLARK *Silent* STREET RAILWAY TRUCKS

Some CLARK *products*

TRANSMISSIONS

BLIND RIVETING PROCESS

AXLE HOUSINGS

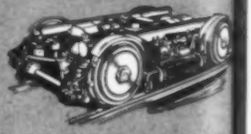
FRONT AND REAR AXLES FOR TRUCKS AND BUSSES

DRILLS AND REAMERS

GEARS AND FORGINGS

ELECTRIC STEEL CASTINGS

INDUSTRIAL TRUCKS AND TRACTORS


RAILWAY CAR TRUCKS

METAL SPOKE WHEELS

For Positive START and GO use IGNITION PARTS *by*

Masterpieces of Ignition Know-How

Filko STANDARD and HIGH SPEED COILS

for all car models since '26

The minute you take a Filko Coil out of its box, you'll have your answer as to why more and more mechanics are asking for Filko Coils by NAME. For Filko Coils look like tops in quality and they are! Filko's 22 years in IGNITION . . . in building EXTRA VALUE into evety ignition part . . . guarantees you the utmost in Coil dependability. Of course, they're water and oil proof . . . they deliver the hot intense spark needed for high speed and smooth engine operation. And they're INDIVIDUALLY TESTED before they leave the Filko Factory where they are built complete from start to finish.

ASK FOR FILKO COILS by name . . . it's good business for you *and* your customers. F. & B. Manufacturing Company, 4248 W. Chicago Ave., Chicago, Illinois.

Filko **IGNITION PARTS** *for all Cars*

Distributor Repair Parts, Coils, Generator Repair Parts, Starter Repair Parts, Dimmer Switches and Relays, Timing Devices, Graphite Bronze Bushings for Generators, Starters and Distributors.

Sea Level Power 12,000 Feet Up

B-W SUPERCHARGED ENGINES . . .

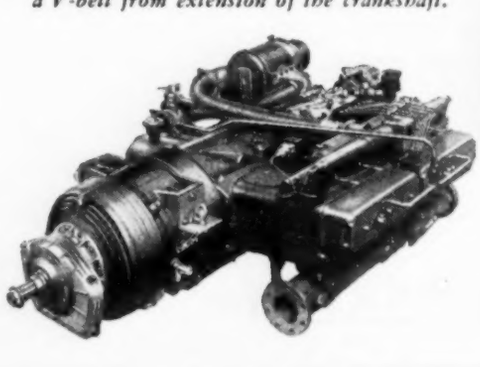
Pull These Motorailers Over The Andes

Faster acceleration from standstill . . . power to negotiate steep grades . . . sea-level performance at Bogota and points 12,000 feet up—these requirements were readily met by the twenty self-propelled rail cars delivered before the war to the Colombian Nat'l Railways.

Built by American Car & Foundry Company, these cars were driven by Waukesha-Hesselman engines *supercharged* with B-W (McCulloch) Superchargers.

Not only have these supercharged engines met all power demands of the motor rail cars with their trailers, but have also enabled these cars to take the place of unobtainable locomotives in hauling strings of freight cars.

Two of these horizontal type Waukesha-Hesselman six cylinder, electric-ignition engines, suspended under the floor, constitute the power plant of each rail car. Note supercharger in upper corner. It is driven by a V-belt from extension of the crankshaft.



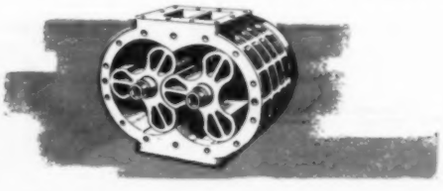
ENGINEERING B-W PRODUCTION

SUPERCHARGERS, INC.

[Formerly McCULLOCH ENGINEERING CORP.]

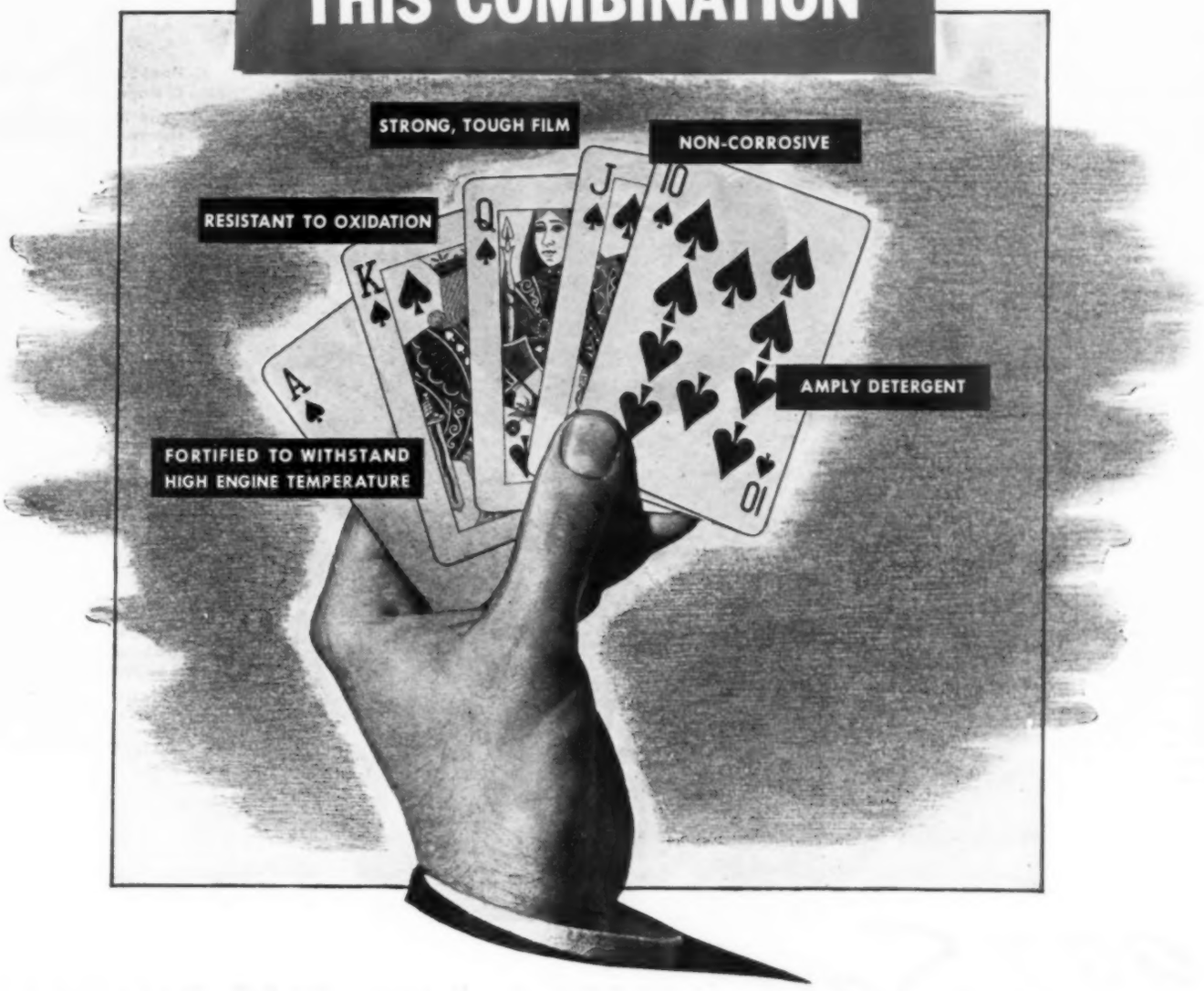
DIVISION OF BORG-WARNER

Milwaukee 9, Wisconsin



B-W Positive Displacement Superchargers supercharge at all speeds and in proportion to the need of the engine for air.

YOU CAN'T BEAT THIS COMBINATION



Wolf's Head Heavy Duty Oil is an expertly blended 100% Pennsylvania oil that combines all of the five characteristics which a heavy duty oil must have to withstand heavy duty operation under severe war-time overload conditions. Other lubricating oils have one or more of these characteristics but Wolf's Head Heavy Duty excels in the expert development of all five. You can't beat this combination for heavy duty service. It is the product of sixty years' refining experience.

Fleet operators the country over choose Wolf's Head Heavy Duty to cut operating costs because it saves engine wear. Proof of Wolf's Head Heavy Duty performance is contained in our free booklet, "Heavy Duty Maintenance." Write for your copy today to Wolf's Head Oil Refining Co., Inc., Oil City, Pa., or New York 10, N. Y.

WOLF'S HEAD LABORATORY CONTROL SERVICE

Gives fleet operators specific recommendations for their units, based on analysis of crankcase oil. Helps to establish correct drain periods, conserve engine life, reduce lay-ups and frequently reveals unsuspected engine trouble. Free and without obligation.

WOLF'S HEAD

MOTOR OIL AND LUBES

100% Pennsylvania P. G. C. O. A. Permit No. 6

Chief Mechanic
Milk Co. (50 vehicles)
Ft. Wayne, Ind.

"I would prefer your one-piece nut used all around as it is a better nut."

Garage Supt.
Omaha, Nebr.

". . . will be only too glad to recommend your products to our Purchasing Dept."

Regional Mgr.
Bus Lines
Tuscaloosa, Ala.

"Having used self-locking nuts on aircraft for a number of years, I fully realize the need and advantage of them and can fully endorse their use on all types of equipment."

Manager
Drive-It-Yourself Co.
Philadelphia, Pa.

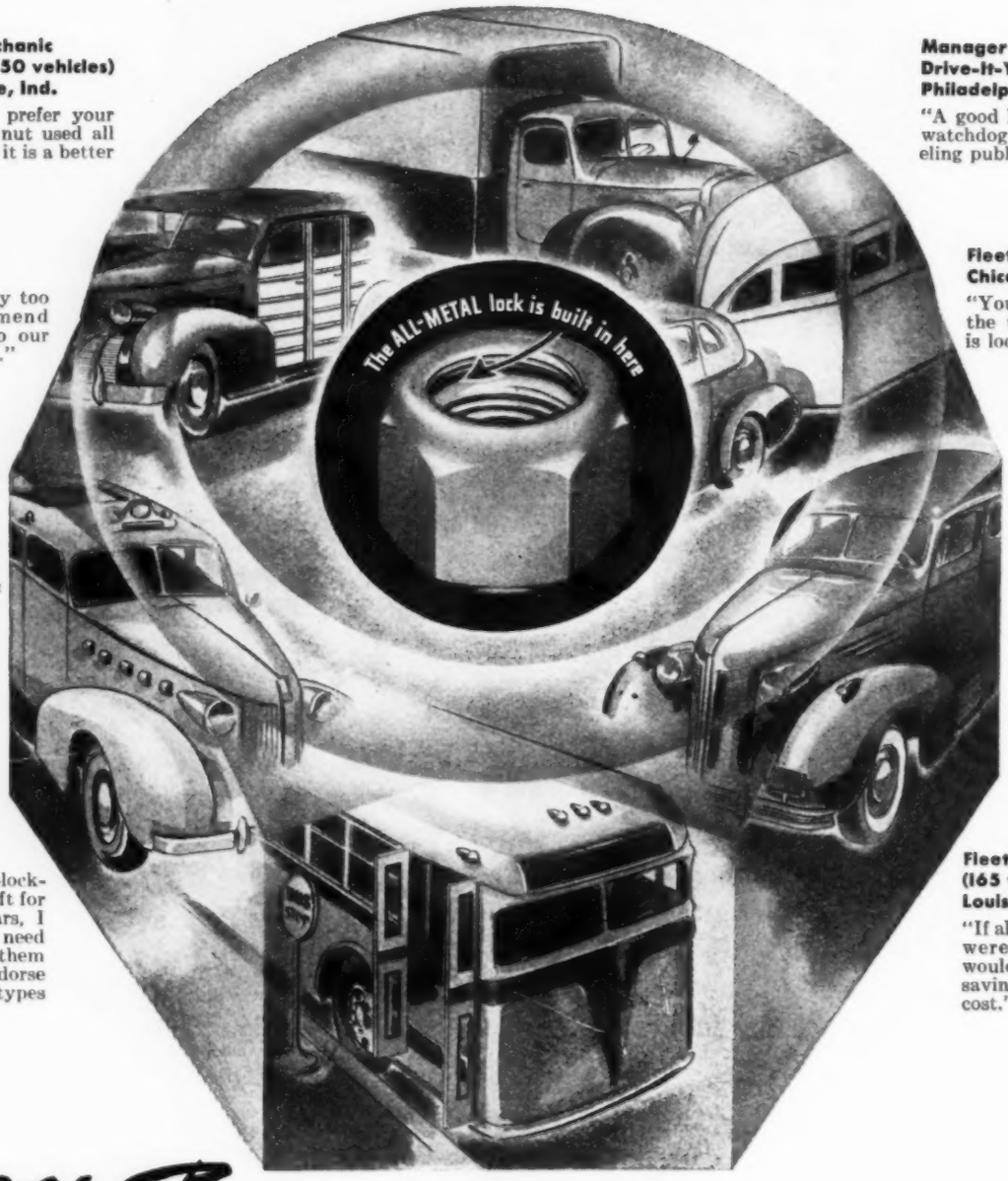
"A good lock nut is a watchdog for the traveling public."

Fleet Supt. 80 vehicles
Chicago, Ill.

"You have something the trucking industry is looking for."

Fleet Supt.
(165 vehicles)
Louisville, Ky.

"If all nuts on this fleet were self-locking, it would sure be a big saving in the operating cost."



99% Say "THESE ARE *THE* NUTS!"

"These nuts will be like a gift from heaven!"

A Kansas City fleet owner put it that way in a recent survey.*

And he was just one! Ninety-nine out of every hundred who replied put down an equally emphatic "YES!", when asked if a nut that fit the description of the Boots All-Metal Self-Locking Nut would improve their post-war equipment.

More than a thousand fleet supervisors—operators of buses, trucks, taxis, trailers—answered this survey. They named over 60 danger spots where nuts shake loose, cause frequent breakdowns, run up repair costs.

On the worst of these vibration spots, the Boots Nut has been tested on many trucks. An entire year of hard-driving wear-and-tear couldn't shake this all-metal nut loose from a single connection!

Naturally, fleet operators insist on the Boots Nut for their post-war vehicles. This all-metal, one-piece nut can't shake loose, despite the severest vibration.

Secured by its built-in lock, the Boots Nut holds with a grip of steel—unaffected by heat, cold, moisture, gasoline, oil or chemicals. Easily removed with an ordinary wrench, it can be used over and over again without accelerated locking loss.

Every Boots Nut right now is helping to build better, safer war planes. Fortunately, your very first post-war models can feature Boots locked-in security. It won't require a single change in automotive design.

***OPERATORS OF 110,000 MOTOR VEHICLES indicated in this survey that if a vibration-proof nut like the above were standard on their post-war equipment, tens of thousands of dollars for maintenance and repairs would be saved.**

Motion Picture—"All Work and No Play"—16 mm., sound—30 minutes. Write for information.

BOOTS

SELF-LOCKING NUTS

"There's No Excuse for a Nut Shaking Loose"

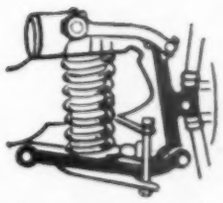
Boots Aircraft Nut Corporation

General Offices · New Canaan, Conn., Dept. A-20

Representatives in New York, Chicago, Detroit, Indianapolis, Los Angeles, Kansas City, Dallas, Toronto, Montreal, Vancouver

25 years of Progress!

Moog Electrically Heat Treated Springs



Moog Coil Action Replacement Parts

Moog X-Plus **FULL POWER** *Piston Rings*

1919 . . . 1944
25 YEARS
OF PROGRESS

Moog Industries, Inc., and its Divisions: St. Louis Spring Company, Moog Coil Action Parts Company and Moog Piston Ring Company, celebrates its Silver Jubilee.

As we at Moog look forward, we express our thanks to our many loyal customers who have made these past twenty-five years, years of progress and solid growth.

MOOG INDUSTRIES, Inc.

ST. LOUIS SPRING CO. ◇ MOOG PISTON RING CO.
MOOG COIL ACTION PARTS COMPANY

General Offices: 6650 EASTON AVE., ST. LOUIS 14, MO.

Warehouses in principal cities

LOOK FORWARD WITH MOOG

AGAIN... an Overwhelming Preference!

11 out of 13 Winners of 1944 Bus Maintenance Awards Use Blackhawk Hydraulic Jacks.

Once more, new names appear as winners of the prized Bus Maintenance Awards. And, again Blackhawk *leads the field* in the jack equipment used by the winners!

Since 1930, when these awards were first made, Blackhawk Hydraulic Jacks have been the choice each year of a big majority of the winners. That's proof enough of unmatched dependability. When you need Jacks — buy the best — buy Blackhawks — from your Blackhawk Jobber.

A Product of **BLACKHAWK MFG. CO.**
Dept. J7124, Milwaukee, Wisconsin

9 out of 13 last year

Yes, 9 of the 13 Bus Maintenance Award winners in 1943 used Blackhawk Hydraulic Jacks. *Good management and dependable jacks always go together.*

This seal is found only on BLACKHAWK HYDRAULIC JACKS. It's your assurance of a wise and safe investment.

BLACKHAWK

FLEET OWNER

DEVOTED TO THE BETTER OPERATION AND MAINTENANCE OF ALL AUTOMOTIVE FLEETS

Vol. 33, No. 6—December, 1944

WASHINGTON REVIEW

(The Editor's Column)

10,000 LIGHT TRUCKS TO BE MADE IN FIRST QUARTER

● Last month we reported in this department that 20,000 light trucks would be made during the first half of 1945. . . . More recently WPB actually alloted the steel and other "controlled materials" for these trucks, which means that production should begin with no further delay —we hope. The allotment, however, was sufficient for first-quarter needs only—enough for 10,000 light trucks.

WPB also revealed that the supply of controlled materials for domestic transportation in the first quarter of 1945 will be greater than that alloted for the last quarter of 1944, but less than the amount requested by ODT.

In the allotment was 155,000 tons of carbon steel for replacement parts, for which ODT had requested 160,000 tons, but this is the largest amount provided for this purpose since the start of the war.

All in all, WPB stated that carbon steel requirements for all forms of transportation equipment, including trucks, buses and trailers, were met with amounts sufficient to cover production schedules.

●

TRUCK PRODUCTION LAGS

● Although heavy truck manufacture has been stepped up 35 percent since last June, production is still not up to schedule, WPB recently told industry executives at a meeting in Detroit. . . . They urged truck companies to make every effort to increase output during the remainder of 1944 and in the first quarter of 1945.

Lack of castings and forgings for engine blocks, transmission cases and other equipment component parts is said to be the biggest stumbling block. Another critical item, of course, is heavy-duty truck tires.

Inability to employ additional workers persists, despite the fact that foundries have had preferential manpower treatment and in some instances have spent large sums to improve working conditions.

Director Middlekamp of WPB Automotive Division said that because of a lack of castings, no engine manufacturer is producing up to capacity. The Detroit meeting was held as a result, to try to "do something" about it.

●

APPLY NOW FOR '45 TRUCKS

● Applications for certificates of transfer for the purchase of new commercial motor vehicles to be built during 1945, may now be made to ODT district offices . . . Permission to accept and forward such applications to the ODT allocation section in Washington was granted in an ODT memorandum issued last month.

The ODT points out that it desires to notify manufacturers of heavy-duty trucks of the names and addresses of successful applicants, sixty days in advance of production, so that these vehicles may be shipped into the areas where certificates of transfer have been approved.

Since the entire 1944 production of heavy-duty trucks has been allocated on a few makes and models, the ODT explains, all certificates of transfer issued by the allocation section where 1944 production schedules have been exhausted, will have an expiration date of three months from the date of issuance. . . . On all makes and models where the production schedules have not been exhausted and trucks are either presently in dealers' or branch stocks or are to be manufactured, certificates of transfer will have an expiration date of December 31, 1944. . . . Certificates of transfer

WASHINGTON REVIEW ....

Continued from Page 57

for medium trucks for the remainder of 1944 will also expire December 31, 1944.

Because no light trucks will be manufactured before February, 1945, the ODT has informed its district offices that they may accept and forward to the allocation section light truck applications beginning January 1, 1945. In the meantime, applicants for light trucks will continue to submit a letter from their dealer stating that the truck is available in his stock, giving make, model and serial number and a statement that no certificate of transfer or government exemption permit is held against it.

Applications for bus chassis will be handled in the same manner as those for heavy and medium truck chassis, according to weight classification, with the exception that the make must be designated. . . . Trailer applications will be handled the same as heavy-duty truck applications.

The ODT also announced that effective immediately, persons or companies granted certificates of transfer will *not* have to present these forms to motor vehicle registrars for licensing purposes.

●

TIRE PICTURE AS OF TODAY

● The rubber industry is now consuming more natural and synthetic rubber per month, than in any month in any year prior to 1941, according to Goodrich statisticians. By the end of 1944, consumption will exceed the 1941 rate, with the trend still upward. This condition is due to the fact that the industry has built enough plants and has developed its techniques to a remarkable extent, making such a record possible, in spite of the cutting-off of our natural rubber supply.

SANTA's favorite charity? . . . We have never asked Santa Claus what his favorite charity is, but we'd bet the old fellow would chuckle, "Why Christmas Seals, of course! . . . Let's all buy a sheet today!

Two major problems, however, still face the tire industry: (1) The natural rubber stockpile is still decreasing. (2) We are not yet producing enough tires to satisfy tremendous military requirements and vital civilian needs. . . . However, the solution to the natural rubber stockpile problem seems to be in sight, and with accelerating conversion to synthetic, the gap between supply and consumption is constantly narrowing.

By early 1945, it is anticipated, we should be living within our natural rubber income. The passenger-car tire future is bright, and 1945 replacement tire production will be at least double that of 1944, with enough additional to equip the new cars which (we hope) will be built in 1945. . . . On the other hand, the truck tire outlook is still dark, but after the European victory, the demand should be satisfied within a matter of months.

●

RUBBER ORDER REVISED

● WPB's Rubber Bureau recently announced that Rubber Conservation Order R-1 has been reprinted and revised, with various amendments incorporated, the chief ones of which are:

(1) Neoprene types of synthetic rubber have been removed from allocation control and may now be consumed without limitation as to amount in any permitted product.

(2) Veterans Administration requirements have been included in exceptions previously limited to the Army, Navy and U. S. Maritime Commission.

(3) Consumption of butyl is now permitted in the manufacture of truck and bus tubes, sizes 8.25-16 to 9.00-24 inclusive, for both government and civilian orders.

●

TAKES "PHYSICAL" CONTROL

● ODT has taken actual "physical" control of two of the group of 103 midwest truck lines taken over by the government last August, while some ten others have been released to-date. . . . Federal operations managers have been installed at headquarters of Wilson Storage & Transfer Company, Sioux Falls; and Midnite Express, Inc., Fargo, N. Dakota. . . . It is understood that the heads of these companies have been relieved of their duties, for the "best interests of the government" and that the government would now operate the lines.

●

CAN GET COPPER TUBING

● Distributors of all petroleum equipment, except that for the refining industry, may obtain copper tubing to sell to repairmen for use in repairing this equipment under the terms of Controlled Materials Plan Regulation 9A as amended recently by WPB.

The amended order, which previously applied only to distributors of automotive, heating and refrigeration equipment, now provides that distributors of petroleum equipment who were in business on August 1, 1943, and sold copper tubing for petroleum repair purposes in 1941, may buy copper tubing for this purpose.

ARMY Air and Ordnance officials joined in praise of the war accomplishments of Studebaker recently, as shown in this photo, when that company formally delivered its 150,000th heavy-duty, multiple-drive military truck. . . . Incidentally, Studebaker also delivered its 50,000th Flying Fortress engine at the same time. . . . Army and factory men seem pleased.

America's private truck owners deserve the Nation's handshake

THEY'RE not asking for any praise. They know the job they started out to do isn't finished by a long shot.

But just the same, it's no less than simple justice that the men who own and operate 86 per cent of all the trucks on our streets and highways should get some measure of credit right now for meeting and mastering what looked like a hopeless situation when the war began.

You remember how things were. Rubber supplies were cut off. New tires were restricted to vital wartime equipment. No new trucks were to be built for civilian requirements. The supply of truck repair parts was limited. Mechanics and drivers went into the armed services. Gasoline was rationed. And to top it all, a tremendous amount of special record-keeping had to be done.

What happened? Well it seems like a miracle now. But America's merchants and farmers, manufacturers and wholesalers, utilities companies and the operators of thousands of different businesses, all pitched in and faced the problem without flinching.

And they've solved it, they and their drivers, through voluntary programs of truck, tire and gasoline conservation that nobody would have thought feasible before war struck.

Yes, the war materials have been and are being delivered—the production of the farms has been getting to market—the whole national economy has been maintained on a remarkably even keel, despite war conditions, because America's private truck owners knew that it was vital to keep their motorized transportation on the job.

STUDEBAKER

PIONEER AND PACEMAKER IN AUTOMOTIVE PROGRESS

Now building Wright Cyclone engines for the Boeing Flying Fortress—heavy-duty Studebaker military trucks—the Army's new Weasel

WASHINGTON REVIEW . . . .

Continued from Page 58

TELL ODT YOUR TIRE NEEDS

● Due to the critical tire situation, the ODT now requires a weekly report on "Vehicles Down for Lack of Tires.". . . Such a report must be in your ODT district office on Friday morning of each week and, they promise, if you report any vehicles tied up, promptly, they will try to take the necessary steps to correct the situation. . . . It you have vehicles down for which you cannot get tires, mail a report of it on Thursday afternoon of each week—or *any* week. . . . You may also telephone this report to your local ODT maintenance specialist, it is understood. . . . Since ODT is responsible for the continued operation of your vehicles, why not pass along to them some of the "headaches" that are bothering you? . . . They *ask* for it!

●

PARTS STILL CRITICAL

● Possible methods of meeting requirements of the armed services for critically-needed engine parts were discussed at a recent joint meeting of the Industrial and Automotive and the Farm and Tractor Liquid-Cooled Engine Industry Advisory Committees.

Crankshafts, valves, valve-inserts, cylinder-head gaskets, pistons, valves, sleeves, water-pumps, flywheels and bearings were among the engine parts listed by committee members as being extremely short in supply.

A straight percentage referral to armed services requirements would provide an over-supply of many engine parts without relieving the extreme shortage in critically-needed items, committee members said. They suggested that inventories in all military depots be checked, and that consideration should be paid to the "usage experience" showing the probable durability of needed parts.

An alternative proposal by committee members was a reduction of existent end-product programs by 15 to 25 percent, to so-called "realistic" levels.

●

9-MONTH TRUCK PRODUCTION

● Total production of motor trucks and truck-tractors in the first nine months of 1944 was 539,402 units. . . . Broken down, this figure represents 75,152 trucks for civilian use, and 464,250 units for military use in all sizes. . . . Since there were no light trucks made for civilian use this year, the civilian total of 75,152 units represents 58,836 medium trucks and 16,316 heavy ones. . . . The military figure of 464,250 units includes 188,381 light, 69,407 medium and 206,462 heavy trucks.

Production data on motor trucks and truck tractors for the years 1936 to 1943 inclusive have been revised by weight classification and separated into civilian and military production on the basis of "gross vehicle weight". . . . These figures are now available from the Bureau of Census, Washington, D. C., under the title "*Facts for Industry*" Series.

Previous production figures were assembled on a "rated tonnage capacity" basis. As there was no standardized method employed by the industry in rating tonnage capacity, a large volume of production had been reported in the heavy group, but was shifted to the medium group when reporting on the basis of gross vehicle weight.

These data cover actual production of trucks for military *and* civilian use. They differ from the "factory sales" figures accepted as an index of production before the war. . . . Jeeps, military ambulances and wheel-drive personnel carriers are included; half-tracks and amored cars are excluded. . . . Military classification includes those procured by Army, Navy, Aircraft Resources Control Office, Canada and Treasury for military use. . . . The civilian classification includes those produced for civilian use under WPB Limitation Orders. . . . Production is reported by 37 companies, representing the total industry.

●

TRAILER QUOTAS CHANGED

● Changes in the allocation of quotas to trailer manufacturers under the War Mobilization and Reconversion Act of October, 1944, were discussed at a recent meeting of the Truck Trailer Manufacturers Industry Advisory Committee.

Allocations, which were previously made entirely on a historical basis, will now include a basic allocation of a certain given quota supplemented by the historical percentage of each individual manufacturer, WPB said. The historical basis is the production percentage of each individual manufacturer in relation to the industry's total production during the base years, 1939-1941.

The new plan for allocating trailers under the act will also aid smaller manufacturers by correcting discrepancies in their allocations where their percentage, based on historical allocation, was extremely low, with a resultant allocation limited to a few trailers, WPB pointed out.

WPB officials discussed with com-

THIS big Fruehauf trailer, drawn by a heavy-duty Four Wheel Drive tractor, is truly a "bond wagon" in every sense of the word. . . . Operated by the Clintonville, Wis. Transfer Line, it carries an inspiring invitation to protect the country's flag over the many state and rural highways of Wisconsin and surrounding states, which this fleet covers.

THIS young lady, snapped in a Greyhound shop, is hard at work installing (it appears to us) a new cylinder sleeve in a cylinder-block. . . . Many women have been enlisted by this progressive bus fleet.

TIME TO COUNT THE COST

Now that you are compiling your operating costs for the year, turn the spotlight on spark plugs and see in how many ways they affect expense.

Have your fuel costs been too high? Have you bought too many plugs? Have you been troubled with excessive fouling and oxide coating? All these may be directly traceable to plugs of the wrong Heat Range.

There are intangible items, too, such as misfiring and loss of power when you need it most.

Real economy calls for the best spark plugs you can get—AC plugs engineered for your engine—Heat Range correct for your operating conditions.

If you are not getting full satisfaction from spark plugs, ask the AC Jobber to have an AC Field Engineer contact you. He has been factory trained and can help to definitely reduce operating costs through improved spark plug performance.

Field Service Department,
AC Spark Plug Division, G. M. Corp.
910 Union Industrial Building, Flint, 3, Michigan

Gentlemen: Please send me at once, no charge, the AC Shop Manuals checked: FO-12

- ☐ HOW TO SERVICE SPARK PLUGS
- ☐ How to Service Spark Plug Cleaner
- ☐ How to Service Ammeters and other Instruments
- ☐ How to Service Oil Filters
- ☐ How to Service Fuel Pumps
- ☐ How to Service Air Cleaners
- ☐ How to Service Speedometers
- ☐ How to Service Instruments

NAME _____

FIRM _____

STREET ADDRESS _____ STATE _____

CITY _____

SEND FOR AC SHOP MANUALS

HERE WE GO TO TOKYO—BUY *ANOTHER* WAR BOND!

WASHINGTON REVIEW . . . .

Continued from Page 60

mittee members a proposed method of handling unfinished production on 1944 trailer quotas in relation to the 1945 truck trailer program. Committee members suggested that manufacturers, who had the critical components on hand prior to December 31, 1944, be allowed to carry over for final assembly in 1945 the unfinished portion of the 1944 program, with the provision that these trailers be assembled during a given period in 1945.

ODT officials advised committee members that approximately 18,000 trailers had been released for commercial use on rationing certificates, as compared with the production of 15,500 trailers, during the first nine months of 1944.

The truck trailer industry had previously recommended that truck trailers be removed from rationing by ODT on the ground that the rationing of trucks was sufficient control. . . . John E. Graham, assistant director of WPB's Automotive Division, told committee members that ODT had advised WPB that the industry recommendation could not be considered at this time because of the critical supply of tires and other components necessary for trailer production.

●

REVISES ODT ORDER No. 21

● ODT'S General Order No. 21, having to do with issuance of Certificates of War Necessity and control of commercial motor vehicles, was recently revised, in the form of an amended order (No. 21-A), which is now in effect. . . . The new order does not basically change the existing regulations, but it would be well to read it through, anyway. For your convenience, the following general outline of the amended order is offered:

General Order ODT 21A supersedes General Order ODT 21, as amended, and beginning October 16, 1944, controls the issuance and effect of Certificates of War Necessity and, in part, the operation of commercial motor vehicles thereunder.

Existing certificates, other than fleet unit certificates, issued under the superseded order, are continued in effect but are made subject to the provisions of this order. Likewise, administrative proceedings pending under the superseded order on October 16, 1944, will be disposed of in accordance with the provisions of this order. It is also provided that liabilities, civil or criminal, incurred under the superseded order shall not abate.

This General Order ODT 21A provides that no person shall operate any commercial motor vehicle within the continental United States unless there is in force with respect to such vehicle a Certificate of War Necessity issued by the ODT governing such operation. A commercial motor vehicle is defined as including, among other things, a straight truck, a combination truck-tractor and semi-trailer, a full trailer, bus, taxicab, jitney, public rental passenger car, an ambulance, and a hearse. Private passenger automobiles used as such are excluded. Certain commercial motor vehicles are exempted from all provisions of the order.

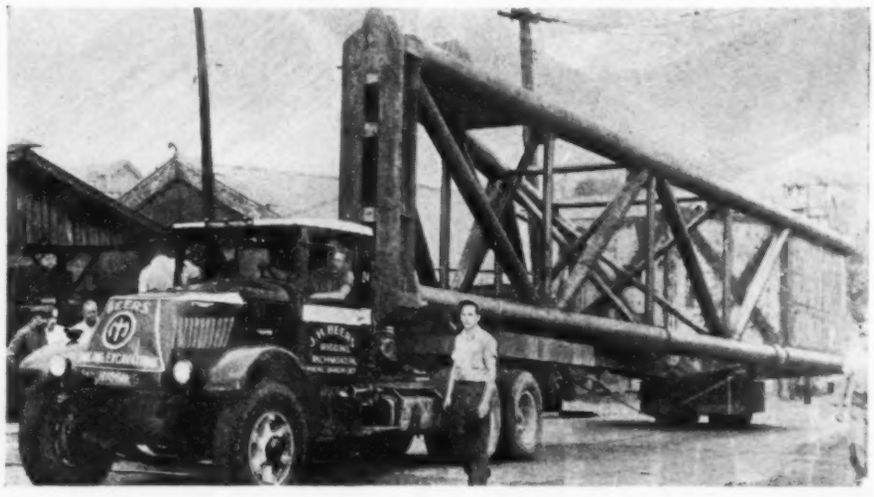
An application for a certificate must be made in writing upon a form provided by the ODT and approved by the Bureau of the Budget. Application forms may be secured from any local war price and rationing board of the OPA, from any County Farm Transportation Committee of the Department of Agriculture, or from any district or field office of the ODT. The application is to be filed in the district or field office of the ODT for the district in which the home office or principal place of business of the applicant is located.

Provision is made for the issuance of a certificate when it is established that the operations of the vehicle or vehicles to be covered thereby are in furtherance of transportation service necessary to the war effort or to the maintenance of essential civilian economy. Each certificate will contain limitations with respect to mileage or motor fuel, or both, which are calculated to assure maximum utilization of the vehicle or vehicles to be operated thereunder, to conserve and providently utilize motor fuel, rubber or rubber substitutes, and other critical materials, and to conform the operations to applicable outstanding orders of the ODT and written public statements of policy issued by its Director.

Fleet unit certificates are abolished. In lieu thereof, certificate holders are required to keep the ODT informed of the specific vehicles being operated by them under their respective certificates. Any vehicle not so reported will not be considered as covered by the certificate.

A Certificate of War Necessity is not transferable. It is provided that in the event of a sale or other transfer of a business or activity in furtherance of which vehicles are operated under a certificate, such certificate shall become void and shall be promptly surrendered by the holder and a new certificate will be issued to the purchaser or successor in inter-

HERE's a safety hint for operators of tank trucks. . . . Pan-American's Eastern Division fire chief, W. H. Hamilton, makes ready with a Kidde fire extinguisher, before they start refueling the big plane.



DOWN to the sea for ships! . . . To paraphrase an old saying, here you see part of a ship, at least, being hauled on a Mack tractor-trailer. . . . It's a pre-fabricated boom tower (whatever that is) which weighs 35 tons, is 58½ ft. long, 23 ft. wide and, when loaded, must have 17½ ft. to clear low bridges. . . . The trip was from Allentown to Philadelphia, Pa.

7,000,000 Miles of Stop-and-Go Driving

—and VALVOLINE stands the test!

"We have been using Valvoline Motor Oils for the last fourteen years, and they have always given us entire satisfaction."

THE RUBEL BAKING CO.

Bert W. Rubel

Bert W. Rubel,
Vice-President

THE RUBEL BAKING CO.
Cincinnati, Ohio

Rubel trucks travel more than half a million miles a year—and bakery trucks, with their innumerable stops and starts, are subjected to extraordinary wear.

If you have a "tough" fleet lubrication problem, Valvoline Motor Oils and Lubricants and Valvoline Fleet Laboratory Service can save you money and extend the useful life of your equipment. Write your nearest Valvoline office today!

COSTS MORE TO MAKE—COSTS LESS TO USE

VALVOLINE

The 1st Pennsylvania Oil

VALVOLINE OIL COMPANY

570 EAST FIFTH STREET CINCINNATI 2, OHIO

New York-Chicago-Atlanta-Los Angeles-Vancouver

REFINERY IN PENNSYLVANIA

WASHINGTON REVIEW . . . .

Continued from Page 62

OUT in Chicago the War Savings Staff is particularly active in getting fleet owners to paint their trucks with attractive, colorful War Bond messages. . . . This good example is owned and operated by Fuhrman & Foster, Chicago. . . . Besides featuring an unusual type of art work, it shows that other bodies, besides trailers, can be thus painted.

est upon his application therefor without further showing. Provision is also made for a situation wherein the sale or other transfer is for a portion only of the certificate holder's business or activity.

A certificate issued under this order becomes effective upon the date of its issuance and remains in effect according to its terms until amended or modified, or until suspended, recalled, cancelled, or revoked in whole or in part, for good cause. This order sets forth what constitutes good cause, and also provides for summary cancellation of certificates under certain circumstances. Any certificate holder aggrieved by any determination of limitations or requirements certified in a certificate, or by any amendment, modification, suspension, recall, cancellation, or revocation, may apply for reconsideration, review or appeal, in accordance with established procedures.

The order requires the periodic inspection of tires of commercial motor vehicles. An exception is made in favor of such vehicles as are not licensed for highway operation, or which by reason of limited license cannot be operated over highways necessary to be traveled in order to obtain tire inspection.

Under the terms of the order, whenever the ODT deems it advisable or necessary to the prosecution of the war or to the maintenance of essential civilian economy, or in the public interest, it may cause any commercial motor vehicle to be operated in such manner, for such purpose, and between such points, as the ODT may direct, or to be leased or rented to such person or persons as the ODT may direct.

Operators of commercial motor vehicles are required to prepare and maintain records in respect of the operation of their vehicles. These records are to be open to inspection by the ODT at all reasonable times. . . . This general outline shall not be construed to alter the meaning of any provision contained in the order.

●

DECRIES POST-WAR PLANNING

● A blunt warning against indulging in the "luxury of post-war planning" while the nation is in danger, was sounded last month by Col. J. Monroe Johnson, chief of ODT. . . .

CHIEF, dalmatian mascot of New York City's Fire Department, rides to the blaze in state in this "side-car" on one of the big Mack pumpers. . . . When the gong rings, Chief is one of the first in his seat.

"At this time," he said, "with still two wars to be won, the words 'post-war planning' can be, in effect, slacker words, if they divert one ounce of our energies from the total war effort."

●

TRUCK-TANKS EASED

● Elimination of restrictions governing the production of trailer and truck-type tanks was recommended by members of the Trailer and Truck Manufacturers Industry Advisory Committee at a recent meeting. . . . Tank body production is prohibited by General Limitation Order L-253, except under specific authorization by WPB as to the amount of iron and steel allowed.

Manufacturers are required to file applications for steel under Controlled Materials Plan Form 4-A, or Form 4-B in the case of repairs. WPB officials pointed out that if the limitations of L-253 were removed, control would still be exercised by WPB under CMP regulations.

WPB officials said that although flat-rolled steel products, both plate and sheet, are now in fair supply, stainless steel for milk tank production is still short. If restrictions under L-253 are removed, the use of stainless steel for tank production would be restricted under Order M-126, WPB said.

The committee was informed that Form WPB-3820 must be filed in conjunction with the CMP 4-A or 4-B application when increased production is involved. Form 3820 must reflect the number of additional workers, if any, required to produce the product for which materials are requested. . . . However, WPB officials said that it is not necessary to submit Form 3820 if the CMP application or an accompanying letter states there is no increased production. . . . WPB cannot authorize increases in production until favorable recommendations for such increases are made by area War Manpower Commission and area Production Urgency Committee offices, it was pointed out.

With the concurrence of ODT officials, WPB said that there would be no minimum production in 1945 of either petroleum or milk tank trailers.

●

NEEDN'T POST TIRE NAMES

● The requirement that local war price and rationing boards post a weekly list of applicants granted ration certificates to buy new tires, was canceled last month by OPA. . . . Instead, local boards will make the names of persons granted new tire certificates, available to any interested persons.

MERCHANDISE IS ON THE MARCH

Hats off to that valiant army of commercial truckers whose efforts to supply the home front have eased the sting of wartime shortages ★ But for the never-say die philosophy of this organization and the recognized stamina of the finest rolling stock in the world, this country would have been faced with a condition which, by comparison, would have dwarfed our current inconveniences ★ We, of Bendix-Westinghouse, are not without pride for the heavy role Air Brakes and Pneumatic Controls have played in this Victory on the home front. More especially, we are grateful for those countless, unsolicited statements from operators who credit Bendix-Westinghouse Equipment for a major share of their accomplishment in keeping units rolling, safely, efficiently and economically ★ Naturally, in view of the record, you will be interested in the many exclusive advantages this world standard of safety holds for you. To relay this information, a nationwide chain of Bendix-Westinghouse Distributors is waiting and ready to survey your individual control requirements.

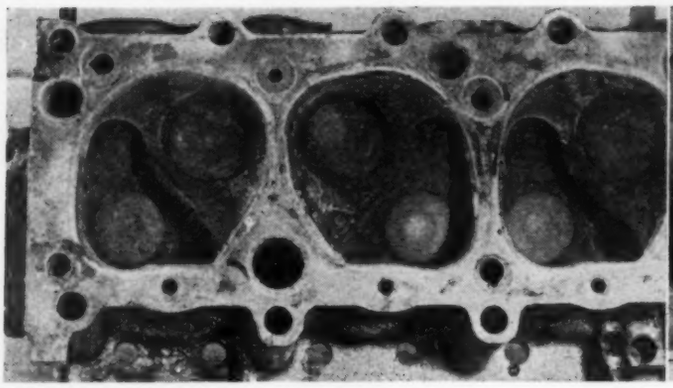
BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE COMPANY . . . ELYRIA, OHIO

Bendix-Westinghouse

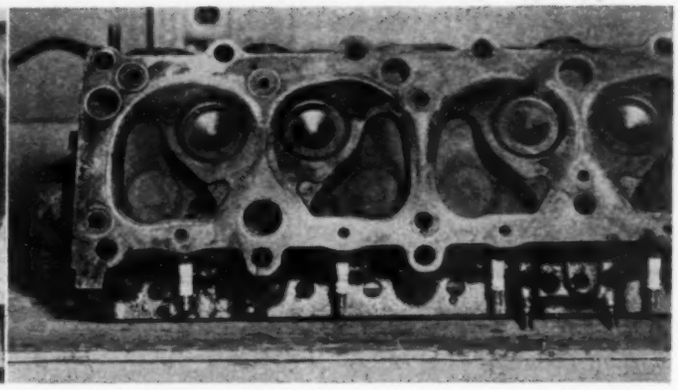
AIR BRAKES

AND PNEUMATIC CONTROL DEVICES

IT IS SIGNIFICANT THAT AMERICA'S FINEST MOTOR TRUCK FLEETS ARE EQUIPPED WITH BENDIX WESTINGHOUSE AIR BRAKES



BEFORE—Cylinder head of Chevrolet truck engine; note carbon.



AFTER—Army tests, with water, cleaned it up as indicated here.

WATER-INJECTION

THE Army is now testing this new method of injecting water into truck engine carburetors, to keep down carbon formations and to slow down the burning rate of the air-fuel mixture and help eliminate fuel-knocks.—Editor.

EVERY fleet man knows how much better an automobile engine runs on a rainy night or, at least, how much better it *appears* to run. . . . The engineers have explained this phenomenon by stating that the moisture in the air simply slows down the rate of combustion and causes the engine to deliver *smoother* power.

A much-mooted question has been whether or not *greater* power is actually delivered? One school of thought claims that the power is actually *less*, because of the loss in volumetric efficiency, due to the fact that the moisture occupies a certain amount of space in the air that is taken in, and that there is, therefore, less oxygen present to aid the combustion. Another school of thought claims that the actual power developed is *greater*, oxygen or no oxygen. And a third theory has been that the water decomposes into hydrogen and oxygen at the time of the "explosion", thus producing not only more oxygen, but more fuel (hydrogen) as well. . . . . Perhaps the third is nothing more than a theory; this writer does not know.

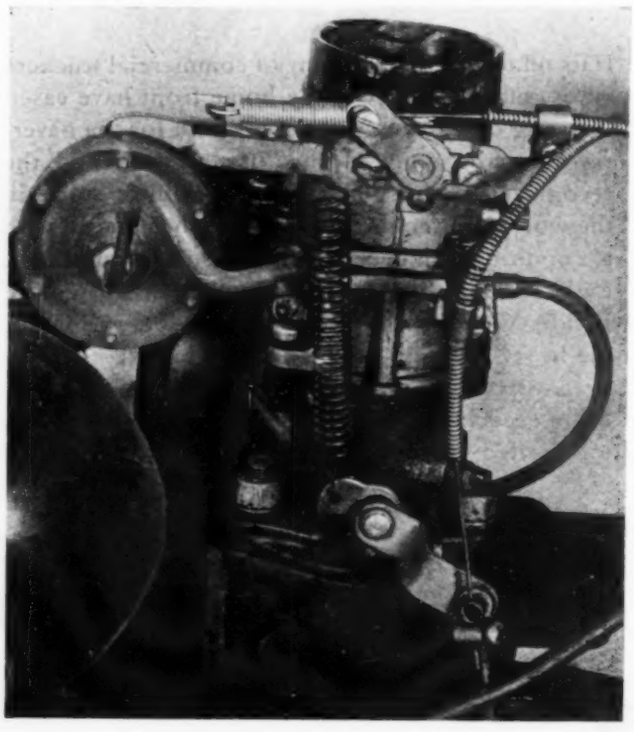
However, it has been generally agreed that the injection of water at the time of combustion, besides creating the illusion (if nothing more) of greater and smoother power, also works wonders in cutting down the formation of carbon. More recently, it has been observed that water-injection also provides almost knock-less operation on wartime fuels of lowered octane-rating and permits the air-fuel mixture to be leaned.

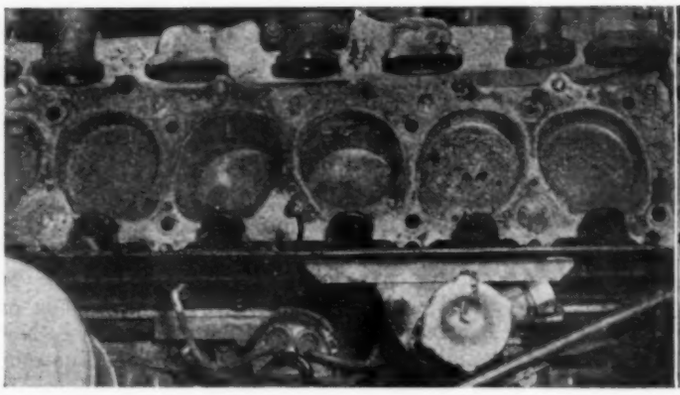
Considerable secrecy has surrounded the current use of water-injection in aircraft engines of the U. S. Army Air Force. It was not until recently that one manufacturerer revealed some sketchy details of the stunt. The following is quoted from the release. "When the pilot requires an added burst of power from his engine, he presses a button. A water regulator, attached to the engine crankcase, introduces a stream of water into the gas line, while a de-richment valve, attached to the carburetor, leans out the mixture. Added engine efficiency is achieved by thus leaning out the mixture, but a lean mixture produces excessive heat by reducing the cooling action of excess gas inside the cylinders. Water-injection overcomes this by keeping the cylinder temperature within the bounds of operating efficiency while the engine is functioning on a lean mixture." The foregoing quotation is from page 138, FLEET OWNER, November, 1944, issue, and the Ford Motor Company is sponsor of the statements made.

Although newly-revived with the advent of modern aircraft engines, the idea of injecting water into the combusion chamber of a gasoline engine is not new.

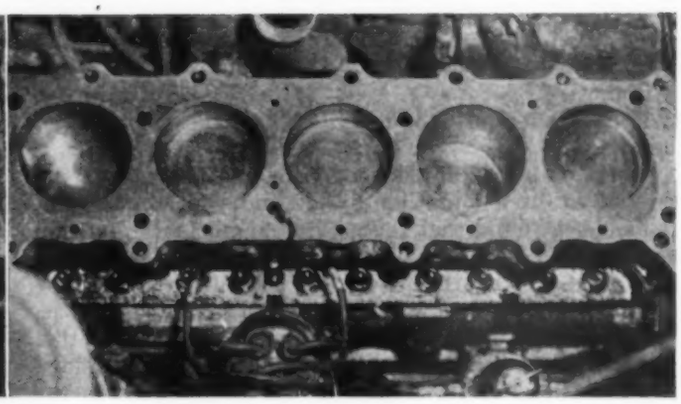
It has been tried out many, many years ago, through the use of various devices. A common oil-cup of the drip-type, filled with water and mounted on the intake manifold, was one of the old-fashioned methods. Another was to utilize exhaust heat to distill water and then inject the steam into the ingoing air stream. Still another proposed a direct stream of water from a tank to the manifold, while another attempted to run an un-

HOW water is piped to carburetor. . . . Note the water regulator.





BEFORE—Piston-tops of Chevrolet truck engine; note the carbon.



AFTER—No carbon scraped; it was just run with water injection.

for TRUCK ENGINES

By Howard Mandy

metered water line from a tank to the carburetor. But few of these methods seemed to work properly; if they had, we would have had water-injection many years ago. In many of these instances, however, the almost complete absence of carbon formation was noted.

Perhaps the easiest way to explain this phenomenon is to concede that the water cools the violent burning of the gases, slows down the combustion rate, and that the moisture sort of "steam-cleans" the inside of the combustion chamber. It is a known fact that water can be made to slow down the burning rate of the air-fuel mixture, which should be especially valuable in these days of high-compression engines and low-compression fuels. That, perhaps, may be one of the solutions to the current problem. It may also provide greater fuel economies and lowered overall maintenance costs, who knows?

But to accomplish water-injection satisfactorily, Army engineers who have toyed with the idea on trucks of the Ordnance Department (this quotation is unofficial) have found that it requires more than merely a water tank and a piece of copper tubing, some fittings and such. But not so *much* more, however, to prohibit the installation of water-injection on a Chevrolet 1½-ton test truck, and a few others, and the photographic results, shown on these pages, seem to speak for themselves.

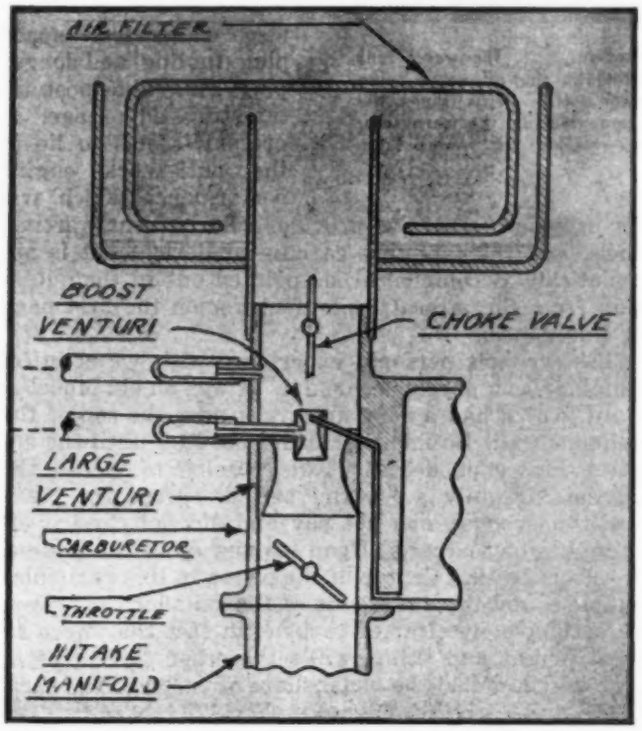
The several parts which comprise the Army's test installations are as follows: (a) a water tank; (b) an automatic shut-off valve to stop the flow of water; (c) a water regulator or metering device; (d) a carburetor connecting fitting. And, of course, some lengths of copper tubing and standard automotive brass fittings.

The apparatus which is being used in the Army's tests (again we say, the quotation is not official—but we got it from right near the horse's mouth) works somewhat as follows: The water tank is orthodox, but is equipped with a sight-gauge for easy observation of the water level. The water shut-off valve is new, and is operated by oil-pressure, taken from a line hooked to the oil-gauge or filter fitting. Thus, when the engine starts, and oil-pressure builds up, the water is permitted to flow by gravity to the water metering device. When the engine is stopped, the oil-pressure drops, and the water is automatically shut off—otherwise we'd have a flooded carburetor and engine.

The water metering device, or regulator, appears to be a patented mechanism which shortly, it is said, may be produced by a Chicago manufacturer. It controls the quantity of water that may pass to the carburetor, and looks like a simple, fool-proof mechanism that utilizes a variable metering jet, controlled by a vacuum-operated diaphragm. There is also a vent connected to the carburetor, below the choke valve, to prevent excessive water flow while choking the engine. Venturi vacuum is utilized in connection with the metering jet to properly control the flow of water, but no attempt

(*Please turn to page* 68)

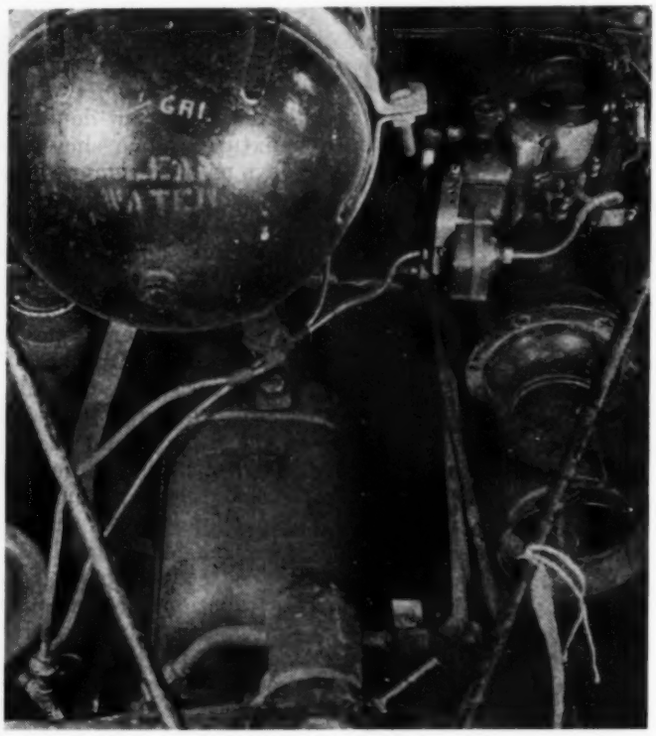
THIS drawing shows where water goes. Water valve is not shown.



will be made here to describe the exact mechanical details.

Since water is introduced into the carburetor air stream through a discharge jet and vent connection, it has been found that the maximum efficiency and fuel economy are obtained by locating the water discharge jet outlet in the throat of the booster or secondary venturi, slightly below the main fuel discharge nozzle, as shown in the drawing which accompanies this article. With this particular installation, water flowing into the venturi creates a "spoiling" effect on the suction at the fuel discharge nozzle, and reduces the fuel flow. Installing the vent connection in the air-horn, below the choke valve, balances out the high suction in the venturi when the choke valve is in the closed position.

In the Army's test installation, the water tank is mounted on top of the engine and the water regulator is attached directly to the carburetor, as shown in one of the illustrations. The shut-off valve (a small gadget) is installed on the T-fitting going into the oil-filter, as is also shown in one of the illustrations accompanying this article. This valve, incidentally must be located *below* the bottom of the water tank, to get gravity flow. Two holes are drilled in the body of the carburetor, as shown in the schematic drawing, to accommodate the water discharge jet and the vent line.



HERE's the complete water-injection set-up. . . . The water tank is suspended under the hood, the automatic shut-off valve being installed on the oil-filter fitting (lower left.) From there the water goes to the metering device, mounted on the carburetor (right) and thence thru body of carburetor into the venturi tube.

With the particular device heretofore described, only two preliminary adjustments are necessary after installation, we are informed, as follows: In order to get water to start flowing from the water jet at engine speed lower than where the main fuel nozzle flow begins, raising or lowering the position of the regulator (by bending the mounting bracket) will provide this adjustment. For top performance, the variable jet in the water regulator should be set at a ratio of one-to-four or one-to-five. This means that one gallon of water will be consumed for every four or five gallons of gasoline. Both of these adjustments must be made at the initial installation. The thing to achieve is a definite flow of water commensurate with the steady fuel flow from the main fuel discharge nozzle in the carburetor.

The illustrations which accompany this article are actual photographs from test engines used by the U. S. Army, somewhere in the United States. No information was given as to the length of testing time. Unofficially, it is understood that the results are gratifying, and the photographs, we are assured, are un-retouched and absolutely bona-fide. Because of the fact that the Army has as yet released no data on this subject, it is impossible to provide the reader with any concrete facts. Whether or not water-injection on truck engines will turn out to be another "secret weapon", this writer does not know. Neither does he know when and if the Army will adopt water-injection for its hundreds of thousands of automotive vehicles now in service. Nor as to just how soon pilot models of the apparatus may be made available to civilian motor vehicle operators for test purposes.

In the meantime, arrangements are being made to manufacture the various parts comprising this system of water-injection for general availability to the public, in "kit" form, for field installation on existing vehicles. Here's hoping that it works as well as the Army's (unofficial) reports declare it does.

Advocates of water-injection claim that when water, properly metered, is added to the air-fuel mixture, the combustion temperature will drop and much detonation will be eliminated, resulting in smarter pick-up and smoother performance. They also claim that the "super-heated" steam in the cylinders and combustion chamber will quickly clean carbon free from all surfaces, valves, etc., and even from behind piston rings. They also claim less spark plug fouling and longer plug life. The most interesting advantage, at present, seems to lie in the anti-knock engine performance which water-injection is said to provide, with current wartime fuels, and the fact that carburetor derichment is automatically accomplished, as pointed out in the quotation from the aircraft manufacturer on the first page of this article.

The writer's personal experience with water-injection has been purely accidental. It was an old Model-A Ford, which had a very fine crack near the top of the cylinder wall. So fine that it did not leak until the engine's heat expanded it. It was possible to operate the engine for quite a lengthy period, before the crack really opened up one hot day and did not close itself up of its own accord. Upon tearing down the engine, it was noted that the top of the piston in this particular cylinder, and the under-side of the cylinder head, were both completely clear of carbon; in fact they were almost bright and shiny, while the other three pistons and cylinders had the usual share of carbon. This early

(*Please turn to page* 128)

WINTER IS ROUGH ON HORSEPOWER

● One way to keep horsepower on the job, even in coldest weather, is to keep the motors clean.

Everyone knows that a clean motor runs better and lasts longer. And Casite *cleans* out motors, *keeps* them clean.

Casite is helping thousands of fleet units stay on the road . . . rolling up precious additional miles.

With Casite in the crankcase, engine performance goes up, operating costs go down.

THE CASITE CORPORATION
HASTINGS, MICHIGAN

WHY YOU NEED CASITE:

- It quickly cleans out harmful sludge deposits.
- Retards the formation of engine varnish.
- Frees sticking valves and rings.
- Keeps oil from congealing; speeds oil flow . . . gives a fast, sure start, even in coldest weather.
- Gives better and smoother performance.

Keep Casite in ALL Your Motors . . . ALL the Time

CĀSITE

CLEANS OUT MOTORS
KEEPS MOTORS CLEAN

IT'S A PRIVILEGE TO BUY WAR BONDS

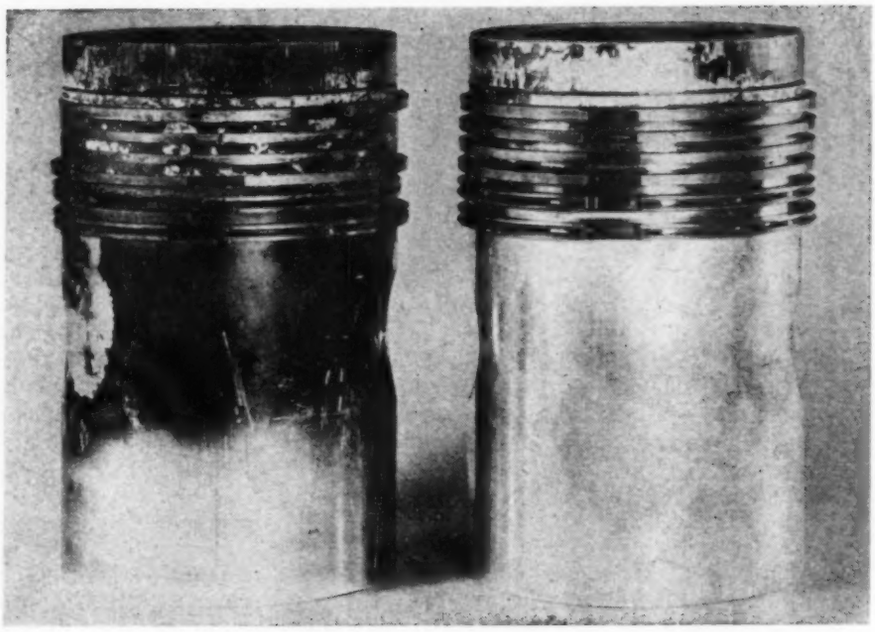


FIG. 1—Two diesel pistons after 480-hr. laboratory test run. The one on the left with straight mineral oil; that on the right with oil having inhibitor and detergent additives.

WHAT is the ESSENTIAL "DETERGENCY" or

TESTS, both in the laboratory and on the road in actual fleet operation, indicate that the essential function of heavy-duty oils should be defined as "dispersancy" rather than "detergency"—and that they are not effective "cleaning agents" for hard, adherent or baked deposits, nor in engines having limited oil-washing action.

ADDITIVE-treated oils for heavy-duty engine service, of the type meeting the requirements of U. S. Army specifications, have come to be known as "detergent oils", and oils of this type containing oxidation and bearing corrosion inhibitors and "detergent" additives, are now widely recognized as being much superior to the straight mineral oils for lubrication of engines in severe or difficult service.

The origin or originator of the term "detergent oil" is obscure, but since this designation has become so popular, it is considered of interest to investigate the fitness of this name for heavy-duty type oils. . . . Webster's definitions are as follows:

Detergent: The adjective is defined as "cleansing" or "purging"; the noun is given as "A cleansing agent or solvent". . . . *Detergency:* This is a noun, which Webster defines as "Cleansing quality or power".

A literal interpretation of "detergent oil" thus indicates an oil having cleansing, purging or solvent properties, which would imply its ability to remove sludges and deposits from dirty engines. . . . But dispersing action has also frequently been mentioned in connection with heavy-duty oils, and Webster defines these words as:

Disperse: The verb means "To place in a state of suspension, as finally-divided particles in some other substance". . . . *Dispersion:* This is a noun, which means "Act of dispersing or state of being dispersed". . . . To complete the petroleum dictionary, it seems desirable to coin and define two additional words which do not appear in Webster, as follows: *Dispersant:* This is a noun, meaning "An agent for imparting dispersing powers or properties; a dispersing agent or medium". . . . *Dispersancy:* This is also a noun, meaning "Dispersing quality or power".

Detergency thus tends to imply the property of cleaning out dirty engines, whereas dispersancy would indicate the property of maintaining insoluble matter (sludges and contaminants) in dispersion in the oil so that they will not settle out and ultimately build up as deposits. . . . The question might therefore be:

"Is the function of heavy-duty,

FIG. 4—Two pistons from light truck engines in short-haul, city service over four winter months. Left piston was run with straight mineral oil; right one was run on heavy-duty oil.

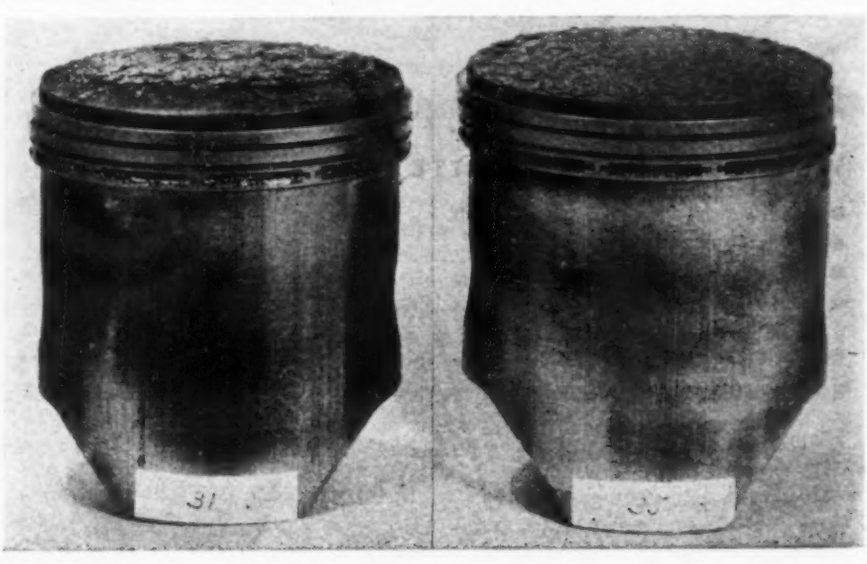


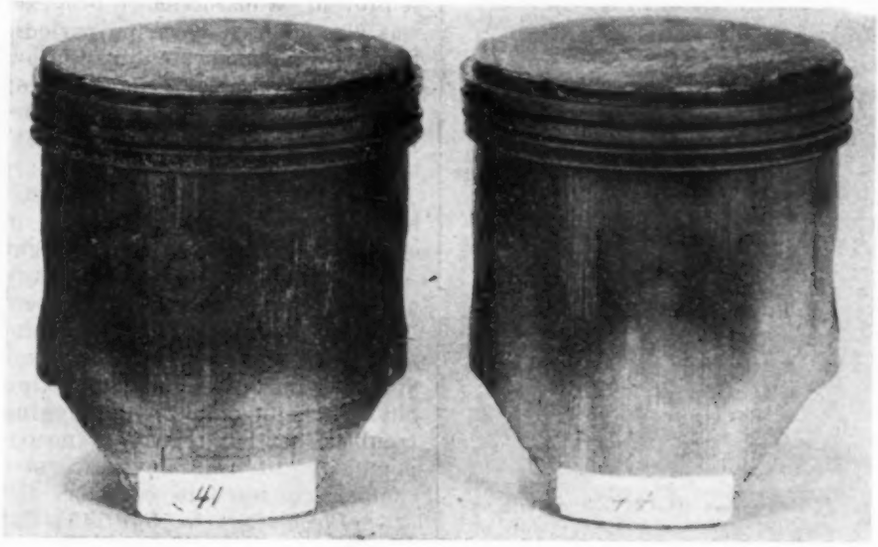
FIG. 2-3—Two diesel pistons after 80-hr. test run, set up to simulate imperfect combustion. . . . Left piston was run with straight oil; the right one was run with heavy-duty oil.

FUNCTION of H. D. OILS? "DISPERSANCY"?

By Carl W. Georgi,

Technical Director, Research Laboratories, Quaker State Oil Refining Corp., Oil City, Penna.

FIG. 5—Two pistons from light truck engines in city service subject to cold sludging. . . . Left piston was run with straight mineral oil; right one was run with heavy-duty oil.



additive-treated oils to clean up and rejuvenate dirty engines or to maintain clean engines in clean condition for the maximum possible periods of operation?" In order to evaluate more definitely these respective functions, a series of laboratory and road tests were conducted over the past few years.

Figure 1 shows two pistons from 480-hour test runs on a single-cylinder diesel engine. These tests were made in accord with Coordinating Research Council practice. The piston on the left is from a 480-hour test with a conventionally refined, S.A.E. 30 straight mineral oil. The piston skirt and ring zone show heavy varnish and carbon deposits and most of the piston rings are stuck. This piston is obviously in very poor condition as a result of oxidation and deterioration of the oil on the hot piston surfaces and the subsequent build-up of these oil oxidation products as deposits. The piston on the right is from a 480-hour test with a solvent-extracted, high viscosity index oil, S.A.E. 30, containing inhibitor and "detergent" additives. The striking difference between these two pistons requires little comment, beyond mentioning that the inhibitor additive minimized oil oxidation, and any insoluble oxidation products which did develop were largely kept in dispersion in the oil, instead of adhering to the piston surfaces and building up as deposits. Fig. 1 serves to illustrate the typical difference between straight mineral and heavy-duty oils for lubricating engines in heavy load service wherein high ring belt temperatures develop.

Figure 2 shows a typical piston from a 6-cylinder diesel engine test, run for 80 hours with an S.A.E. 30 straight mineral oil. Under the particular test conditions the oil was not oxidized to any marked extent, either in the crankcase or on the piston surfaces, and the principal factor involved was heavy contamination of the oil with soot and carbon from the combustion chambers. This test procedure was set up to simulate conditions so frequently encountered in service, wherein imperfect combustion causes formation of large quantities of soot, considerable of which work past the pistons to contaminate the crankcase oil.

(*Please turn to page* 72)

The piston in Fig. 2 from the run with straight mineral oil contains heavy deposits of a pasty, rather gummy consistency, which cover almost the entire piston surfaces and which have completely plugged the upper oil-control ring and partially filled the lower oil ring.

Figure 3 shows a typical piston from an identical 80-hour Diesel engine test with an S.A.E. 30 heavy-duty oil. The marked improvement in piston and oil ring cleanliness resulted from the "detergent" additive contained in the oil, which acted to maintain the soot and carbon contamination in dispersion in the oil so that it did not adhere and deposit on the engine working surfaces. In this test the oil became extremely black and dirty, but there is little argument that it is much better to keep insoluble contaminants in dispersion in the oil rather than to let them deposit out and adhere to engine surfaces.

Figure 4 shows two pistons from light truck engines operated in short-haul, city-delivery service over a period of four winter months. The left hand piston is typical of that removed from an engine which was lubricated with 20W straight mineral oil and the piston on the right is from an engine serviced with 20W heavy-duty oil.

The operating conditions of this truck fleet were such that high rates of combustion chamber blow-by prevailed, causing rapid and heavy contamination of the crankcase oils with fuel dilution, moisture, soot and lead residues from the tetraethyl lead treated gasoline.

The piston from the engine lubricated with straight mineral oil shows the typical condition of oil-ring plugging encountered. These deposits were of a soft pasty consistency and were composed largely of lead compounds and soot.

The right hand piston in Fig. 4 illustrates the effectiveness of heavy-duty oil in minimizing the development of this type of contamination sludge in engines used in light-duty, low-temperature service.

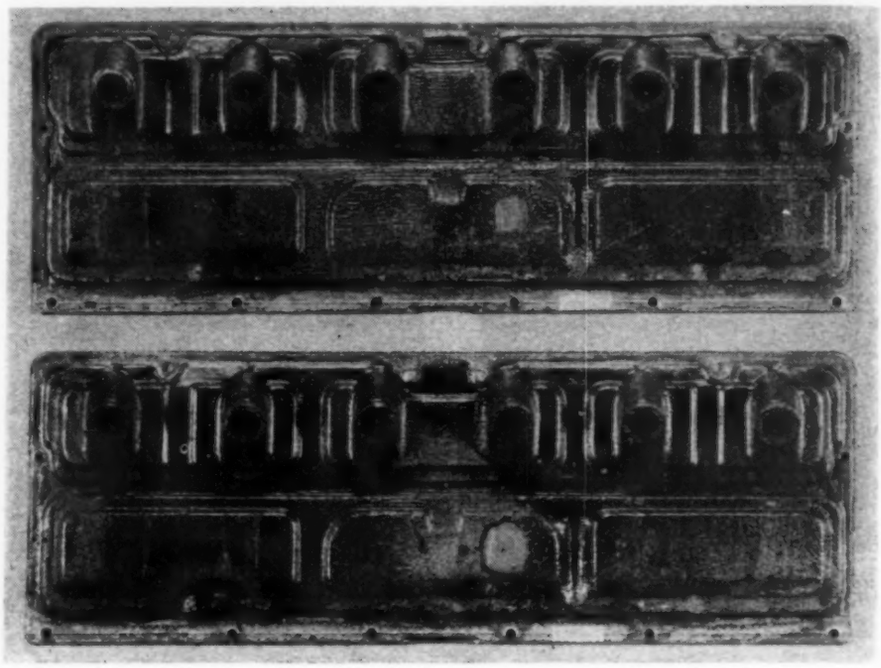


FIG. 6—Push-rod cover plates from engines in same fleet. . . . The upper plate is typical of that from engines run on straight mineral oil. Lower, after 2,000 mi. with heavy-duty oils.

It should be mentioned, however, that at the time this truck fleet was converted from straight mineral oil to heavy-duty additive oil, a comprehensive program of improved engine maintenance and operation was adopted. This consisted essentially of the installation of radiator covers and crankcase pan insulation, to provide higher coolant and crankcase oil temperatures and faster engine warm-up, so that cold engine operation favoring excessively high rates of crankcase contamination was greatly minimized. A preventive maintenance program was also adopted, covering periodic fuel and ignition system inspection, again to minimize the chances of engine operating conditions favoring high rates of crankcase contamination.

It is not known, therefore, just how much of the improvement in engine cleanliness was brought about by the change to heavy-duty oil, and how much resulted from the improved maintenance and inspection program. The fleet operator was interested only in getting out of his sludge and ring-plugging troubles, so that there was no opportunity to run any extensive comparison tests to establish the

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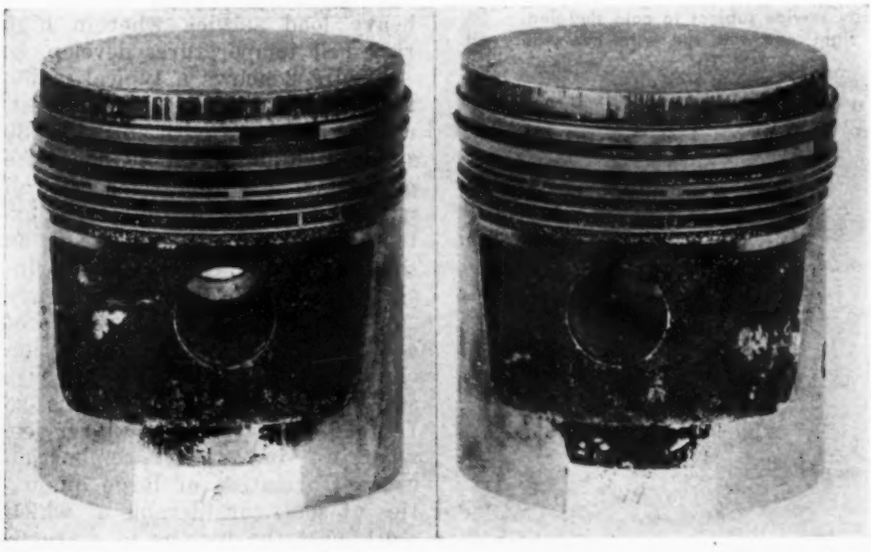
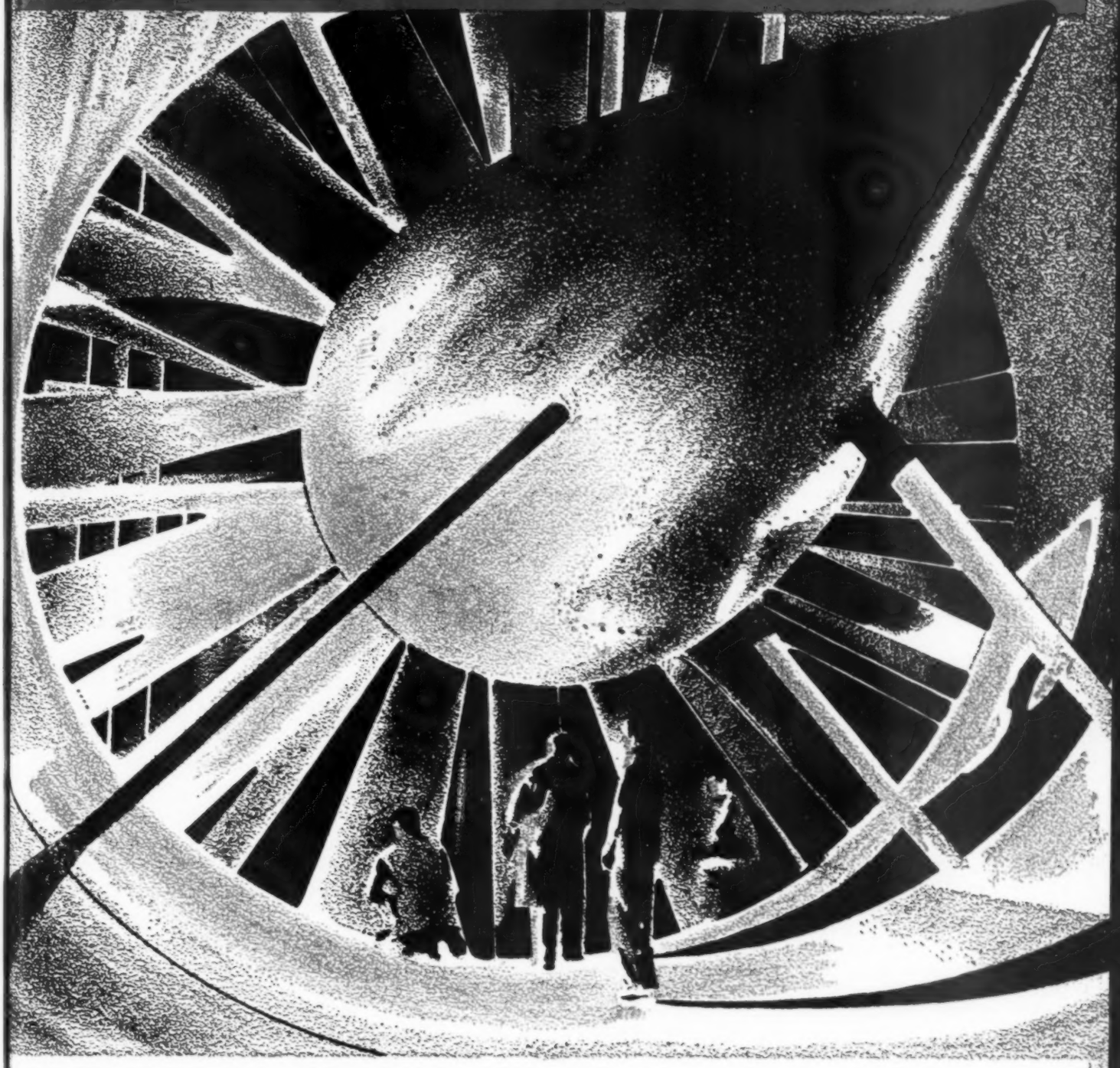


FIG. 7—Two pistons from long-haul fleet operation. . . . Left piston after 40,000 mi. with uncompounded oil. . . . Right, after 5,000 to 10,000 miles of operation with heavy-duty oil.

BRAKES, LIKE WIND-TUNNEL FANS, NEED BALANCE



BALANCED BRAKES *HAVE WHAT-IT-TAKES*

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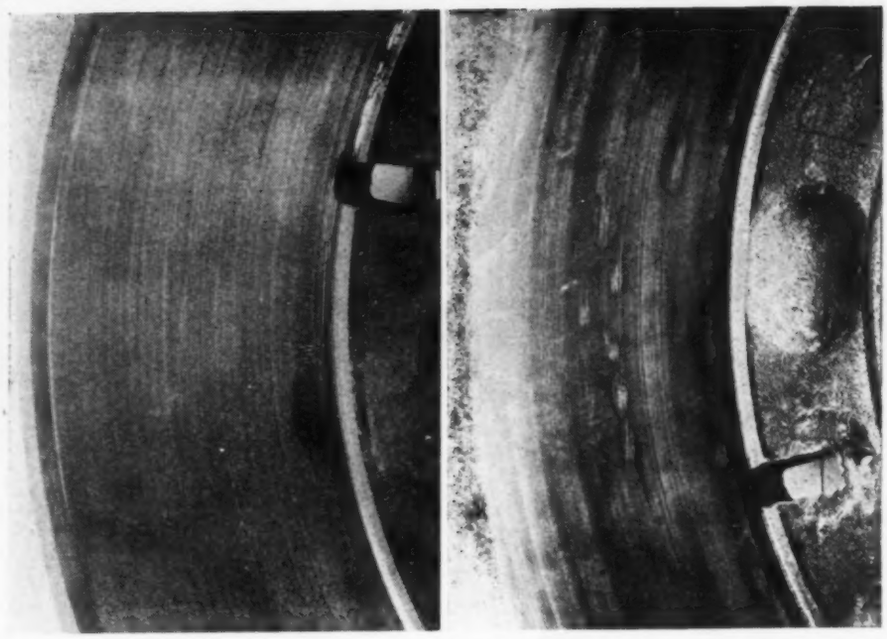

FIG. 1, 2—Heat-checking over small areas with no sharp edges; no reconditioning needed.

SAE-ODT DATA on BRAKE

LATEST maintenance report, prepared for ODT Vehicle Maintenance Section by SAE Maintenance Methods Coordinating Committee, is published here for your convenience—and to cut Uncle Sam's printing costs.—Ed.

MOTOR vehicle brake drums are subject to a number of deteriorating factors which, if not corrected promptly, can impair the efficiency of brake operation and also cause premature failure of other parts. Heat checking, for example, causes excessive lining wear and, in addition, sometimes leads to cracking of the drum. A grooved drum, if used with new lining, will not only wear the lining but it will also make it very difficult, if not impossible, to obtain efficient brake performance. Out-of-round drums make accurate brake adjustments impossible and are likely to cause excessive wear on the moving parts of the entire braking system, due to their eccentric action. Out-of-round brake drums can also cause severe and very irregular tire tread wear.

Since the condition of the brakes vitally affects the reliability and availability of the vehicle for service, it is the responsibility of every truck owner, not only from patriotic motives, but also to guard his own interests, to carry out a regular periodic inspection of the braking system as exemplified in the SAE-ODT report on *"Preventive Maintenance and Inspection Procedure"*. Brake drums must be inspected regularly since, without inspection and the necessary remedial work, incipient failures will progress to the point of actual part failures, causing interruptions in service and requiring replacement of parts which, in many cases, are hard to obtain because manufacturing facilities have been converted to the production of war materials.

The inadvisability of using cracked or broken brake drums is obvious, but the SAE-ODT Committee has convincing evidence that even drums in this condition, which heretofore have been almost always scrapped, actually can be repaired for many miles of additional service.

In order to maintain brake drums properly, the maintenance inspector must be able to recognize incipient failures and must understand the maintenance required to prevent actual failures.

While instructions on brake drum maintenance have been singularly lacking heretofore, the Committee believes that the following information, based upon ac-

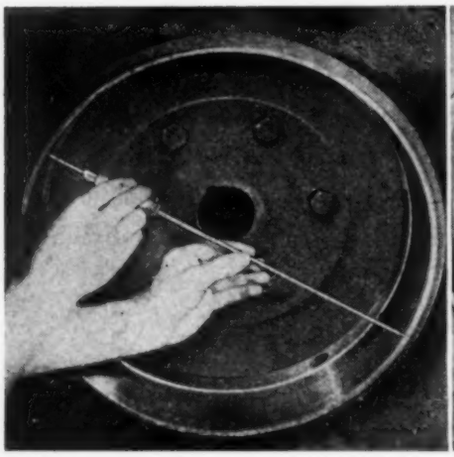

FIG. 6—Measuring drum with inside mike, to determine out-of-round, bulging, etc.

FIG. 7—Another method of measuring, using piece of welding rod and feeler gage.

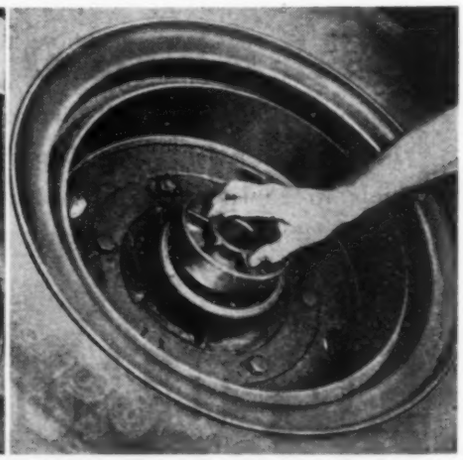

FIG. 8—Be sure to pick proper cone for turning drums, to insure concentric cut.

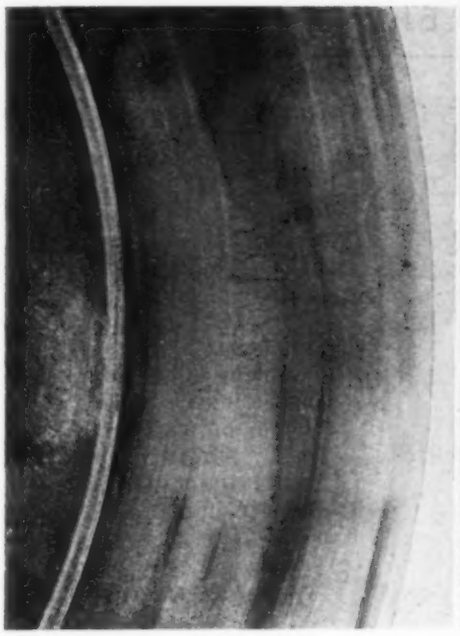

FIG. 3—Medium heat-checking; watch out!

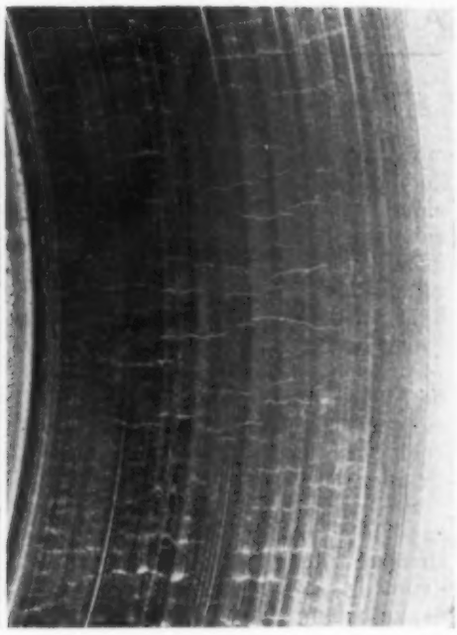

FIG. 4, 5—Severe heat-checking. Reconditioning needed, to insure normal drum-lining life.

DRUM RECONDITIONING

tual practices in truck maintenance repair shops, will prove valuable to any person responsible for the maintenance of automotive brake drums. In the following paragraphs a few of the most common brake drum defects will be reviewed:

HEAT CHECKS:—It appears to be impractical to attempt to measure the extent of heat checking and record the result in figures. As a guide for determining the necessity to recondition drums, the Committee recommends a study of illustrations, Figures 1 to 5, which show various degrees of heat checking, and recommends that these illustrations be considered a guide in determining the necessity for reconditioning brake drums.

GROOVING:—Grooving of brake drums can be remedied by remachining the braking surface, usually at the time of installing new brake blocks or linings. The procedure for avoiding grooved drums lies in the maintenance schedule of the vehicle owner. At the regular preventive maintenance inspections, the brake mechanism should be cleaned, lubricated, adjusted, or tightened, as necessary, and checked for worn or defective parts, which should be repaired. At each inspection, the mechanic must determine whether or not the linings will last until the next inspection. If the brake lining thickness is not sufficient to last until the next inspection, the brake lining should be replaced and the brake drums should be inspected to determine whether or not reconditioning is necessary. If the lining does not need replacement, but is more than half worn, the drums should be cleaned but should not be remachined. At this stage, eliminating the grooves on the drum and smoothing the ridges on the lining would necessitate re-

(*Please turn to page* 76)

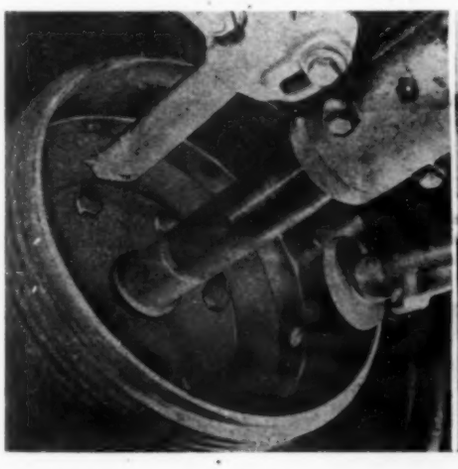

FIG. 9—First cut of .030" has been made on this drum, using a round-nosed tool.

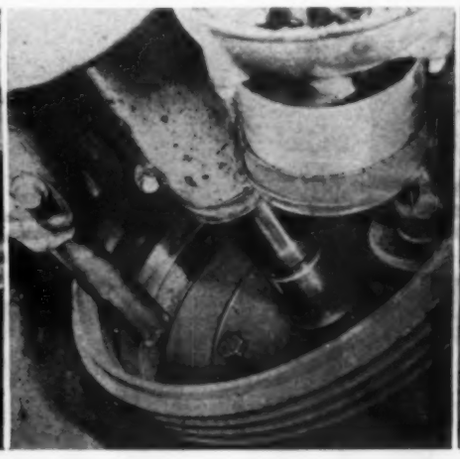

FIG. 10—Second cut with round-nosed tool to remove all traces of irregularity, etc.

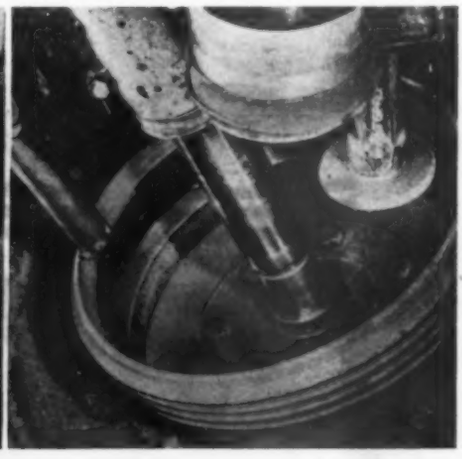

FIG. 11—Finished drum surface; .002" was removed (on radius) to finish this drum.

moval of too much metal and lining, while, if left alone, the grooves and ridges will match and satisfactory service can be obtained.

If the linings are little worn and drum grooving is present, the drums may be remachined and the ridges in the lining may be removed with a lining grinder.

Brake lining thickness can be visually checked through peep holes in the drum or peep holes in the brake backing plate. In order to assist in this checking of brake lining thickness, some operators drill peep holes in the backing plates opposite points of greatest wear on the brake shoes. These peep holes are also of assistance in adjusting brake shoes.

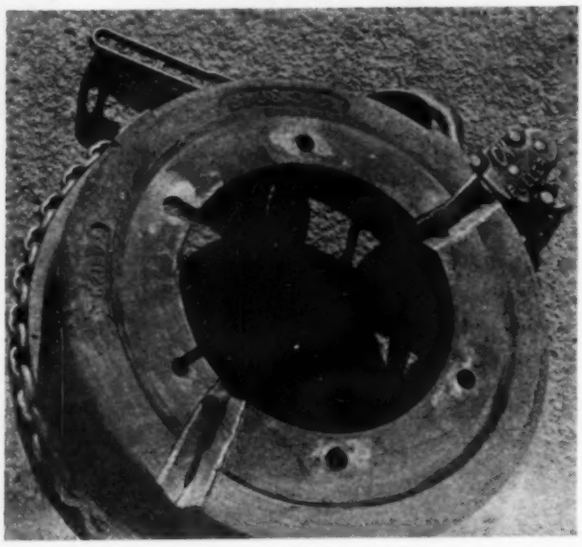

FIG. 12—Note V-cut in drum flange, preparatory to welding.

OUT-OF-ROUND:—Out-of-roundness is a condition which may be measured in several ways and it is generally accepted that a drum more than 0.010 inch out-of-round on the diameter is unfit for service and will cause bad tire tread wear. Out-of-roundness can be removed by returning the brake drum on a lathe.

Figures 6 and 7 show methods of measuring the inside diameter of a drum by using an inside micrometer or a piece of welding rod and feeler gages. It is desirable to take these measurements at the open and closed edges of the drum and at right angles to each other. To determine the amount of bulge, it is necessary to take measurements at several points between the outer and inner edges of the drum.

In practical operation, out-of-roundness may be easily detected when making a regular brake adjustment. The brake shoes may be adjusted for slight drag, the wheel turned by hand and any increase or reduction in drag will indicate out-of-roundness. If the drum is out-of-round, the wheel should be removed and checked with measuring equipment for the degree of eccentricity. If, as outlined above, it is found to be 0.010 inch or more out-of-round, it should be reconditioned, as explained later.

With air brake equipment, the mechanic can determine the degree of out-of-roundness of drums by checking the extent to which it is possible to obtain a standard brake adjustment. At regular brake inspections, brake shoes should be adjusted to specified standard measurements of travel of the cylinder piston or diaphragm rod. If, after making a standard adjustment, the wheel does not turn freely, as a result of the brake drum binding at spots, the drum is out-of-round. Under these conditions, a free wheel can be obtained only by slacking off the adjustment and, if the difference in adjustment between high and low spots for a free wheel is more than 25 percent of the standard adjustment, drum reconitioning is indicated.

BELL-MOUTHED:—Bell mouthing of drums is a condition seldom encountered but, if there is any bell-mouthing at all, the drum should be reconditioned.

Methods of reconditioning used worn and/or out-of-round brake drums are next quite thoroughly covered in the following paragraphs:

DRUM TURNING:—Brake drums, requiring reconditioning for any of the above reasons or because they have been welded, may be refinished by either turning or grinding or both and may be honed to give the smooth finish desired for best brakes and longest lining wear. There are several makes of grinders available, all of which are satisfactory if properly used. Turning may be done on a brake drum lathe, of which there are several makes, including portable equipment, or it may be done on a vertical boring mill.

When finish-machining brake drums, each drum should be mounted on the wheel hub with which the drum will be used and it is essential to select the proper cones for mounting on the lathe, in order to

(*Please turn to page* 78)

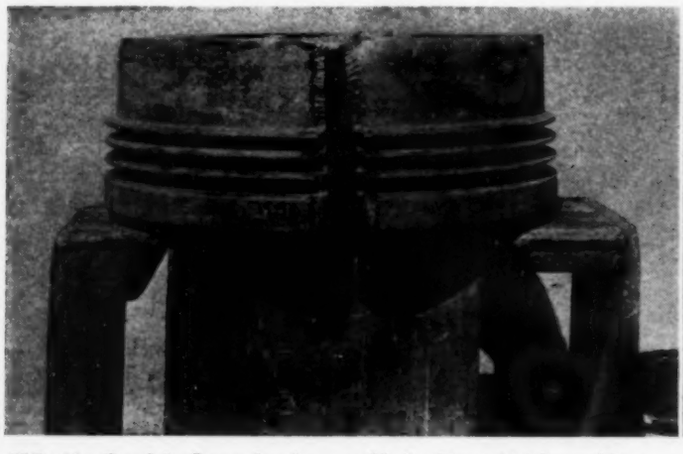

FIG. 13—Crack in flange has been welded. Rim is V'd for welding.

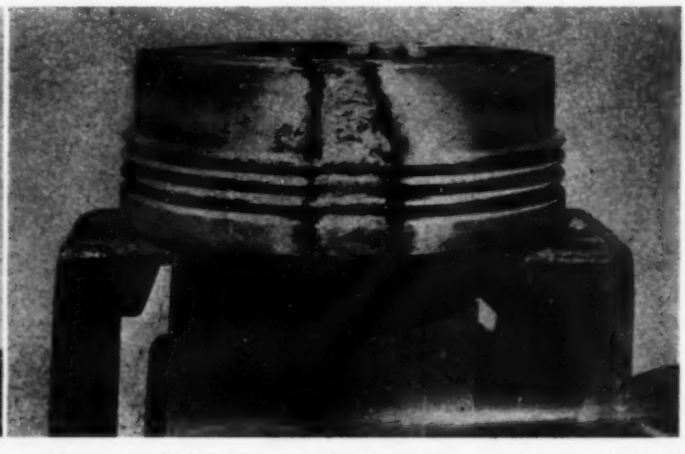

FIG. 14—Weld has been completed and drum ready for machining.

PROVING GROUNDS

In the flaming test of war on land, sea, and air—in 80 types of Allied war planes; in submarines, destroyers, escort and landing craft; in tanks, trucks, and jeeps—American Hammered Piston Rings prove their absolute correctness for every purpose. Koppers Company, Inc., American Hammered Piston Ring Division, Baltimore, Maryland.

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C-43 Traveler
C-45A Voyager
C-46 Commando
C-47 Skytrain
C-53 Skytrooper
C-54 Skymaster
C-56 Lodestar
C-61 Forwarder
C-69 Constellation
C-76 Caravan
C-87 Liberator Express
J-4-F Widgeon
L-1 Vigilant
L-2 Hedgehopper
L-3 Grasshopper
L-4 Grasshopper
L-5 Sentinel
O-52 Owl
P-40F Warhawk
P-43 Lancer
P-47 Thunderbolt
P-51B Mustang
P-61 Black Widow
P-66 Vanguard
AT-6 Texan
AT-7 Navigator
AT-8 Bobcat
AT-9 Jeep
AT-10 Wichita
AT-11 Kansan
AT-13 Yankee Doodle
AT-14 Yankee Doodle
AT-15 Crewmaker
AT-17 Bobcat
AT-19 Reliant
BT-13 Valiant
BT-15 Valiant
PT-13 Kaydet
PT-17 Kaydet
PT-19 Cornell
PT-22 Recruit
PT-26 Cornell
F2A Buffalo
F4F Wildcat
F4U Corsair
F6F Hellcat
N2T Tutor
OS2U Kingfisher
PBM Mariner
PBY Catalina
PB2Y Coronado
SB2A Bermuda
SB2C Helldiver
SB2U Vindicator
SBD-3 Dauntless
SO3C Seagull
SNC Falcon
SNJ Texan
TBD Devastator
TBF Avenger
JRM-1 Mars
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properly center the drum and insure concentric cuts with the tool. Figure 8 shows a properly fitting cone being placed into the hub for lathe mounting.

A round-nosed tool is usually used in the removal of metal, at least on the first cut. The depth of the cut is determined by the operator after he has found the shallowest portion in the drum braking surface. Figure 9 shows a scored drum after a first cut of 0.030 inch on the radius (0.060 inch on the diameter) has been made, using a round-nosed tool. It is frequently necessary to make two cuts in order to remove the required amount of metal to get an even surface throughout the total width of the braking area. Figure 10 shows the position of the round-nosed tool for a second cut, in order to remove all traces of the bowed and scored condition.

The speed with which the drum is turned and the feed of the tool are determined by considerations of drum material and type and power of the machine. The drum lathe manufacturer's instructions should be followed.

For the finish-grind operation, one brake drum re-machining equipment manufacturer recommends a drum speed of 60 revolutions per minute, a grinding wheel feed of 0.010 inch per revolution, and a grinding wheel surface velocity of 6,000 feet per minute. Figure 11 shows the drum surface after the finish-grind, taking a cut with the wheel of 0.002 inch on the radius (0.004 inch on the diameter).

Some operators, rather than remove metal in fixed amounts to match standard lining or shim oversizes, take skim cuts at certain inspection periods, generally 20,000 to 40,000 miles. This is a simple operation and eliminates the necessity of taking heavy cuts. It also eliminates the rapid wear of lining which accompanies the partial destruction of the drum. In this way, complete preventive maintenance may be applied to brake drums.

BRAKE DRUM WEAR LIMITS:—In turning or grinding material from brake drums to re-surface them, the maximum amount of metal which may be removed is determined not only by considerations of safety but also by practical considerations of brake operation. For example, there are operators running heavy

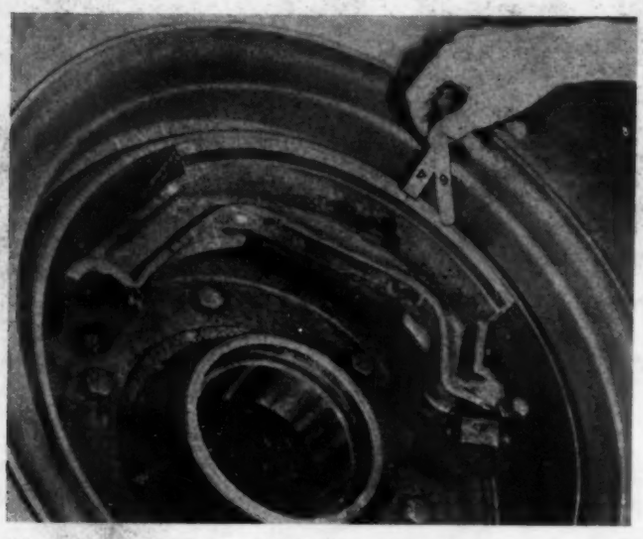

FIG. 19—Shoe-drum clearance should not exceed .004" at any point.

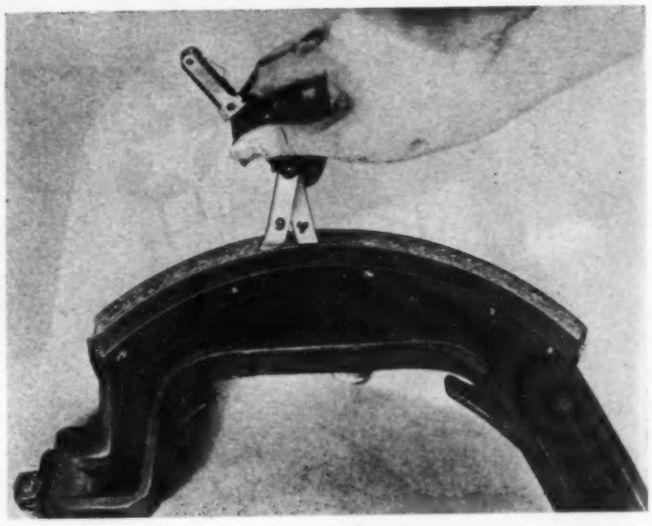

FIG. 15—In relining, no greater than .005" space is permissible.

equipment who remove as much as 40 percent of the original (new) thickness of the brake drum wall before discarding the drum or building it up by welding.

In actual practice, the amount by which the drum thickness may be reduced is limited by drum distortion, which results in poorer braking and rapid lining wear and by the fact that most brake shoes are not adjustable on the anchor-pin end and, as a result, much of the lining in the larger oversizes cannot be worn away. Furthermore, many brake shoes cannot be expanded to more than .250-inch oversize diameter without mechanical interference.

In cases where these difficulties do not apply, it is safe practice to remove up to 25 percent of original drum thickness on heavy-duty (truck-type) brake drums. This refers to drum body only. Ribs or flanges should not be considered part of drum for this measurement.

SALVAGING WORN-OUT DRUMS BY WELDING:—The wearing surfaces of worn cast steel or pressed steel brake drums have been salvaged by arc-welding in the following manner:

1. Set the drum up in a jig or on a welding bench in an upright position, so that welding can be done around drum and drum moved as welding proceeds.
2. Use 3/16 or 5/32 inch mild steel electrode and acetylene rod similar to Oxweld No. 1, 3/16 or ¼ inch. Feed the acetylene rod into the arc so as to put on more metal and speed up application. Put on enough metal so that the drum can be machined smooth.
3. After welding has cooled, chuck drum in a lathe, using hole for the hub as center, and machine smooth.
4. To finish-machine drum braking surface, mount the drum on its wheel hub and finish-machine as outlined under section entitled "Drum Turning" on page 76.

REPAIRING CRACKED DRUMS:—Broken or cracked drums can be satisfactorily repaired by proper brazing and such repaired drums will give good performance. The technique for this type of repair is described in the following paragraphs:

In brazing a broken brake drum, it is first necessary to get the drum as nearly round as possible, which can be accomplished by pulling it together with a chain puller, as shown in Figure 12. This puller is used to hold the drum together while beveling the

(*Please turn to page* 80)

Performance Report of an INTERNATIONAL KS-11

Costs go down and profits go up when trucks are big enough and strong enough for loads and roads . . . with axle ratios and transmissions correctly specified.

The value of *ample truck capacity and power* is being demonstrated daily by new International KR and KS-11's . . . trucks that were recommended in precise terms of the jobs they were to perform.

The truck below is an example. The Dakota Transfer & Storage Co., Minneapolis, Minn., is the owner. In his performance report, R. J. Babcock, president, says of the eight Internationals that his transfer company operates:

"We have just completed an audit of fuel consumption of our KS-11 trucks powered by the Red Diamond 450 engine. We find that on the Grand Forks round trip of 750 miles, these units require only 120 gallons of fuel. This we believe, will be a little higher for warmer weather because we idle the engine a good deal as no anti-freeze is used. In other words, the truck engine runs constantly during the 24 hours the vehicle is away from Minneapolis.

"We are well satisfied with this record of approximately six miles per gallon with payloads as great as 40,000 pounds.

"We have one unit with Red Diamond engine that has traveled 80,000 miles without any service other than preventive maintenance at every 600 miles. **These KS-11 trucks with Red Diamond engines unquestionably are the best Internationals we have ever had!"**

Owner: Dakota Transfer & Storage Co., Minneapolis, Minn.

International Model KS-11; 149-Inch Wheelbase.
Engine: International Red Diamond 450.
Axle Ratio: (2-Speed) 6.14 to 1 – 8.35 to 1.
Transmission: F-54B, Direct in Fifth.
Semi-Trailer: 33-Foot, Dual Axle Type.
Payload: Up to 20 Tons.
Distance: 750 Miles, Round Trip.
Fuel Consumption: Six Miles per Gallon.

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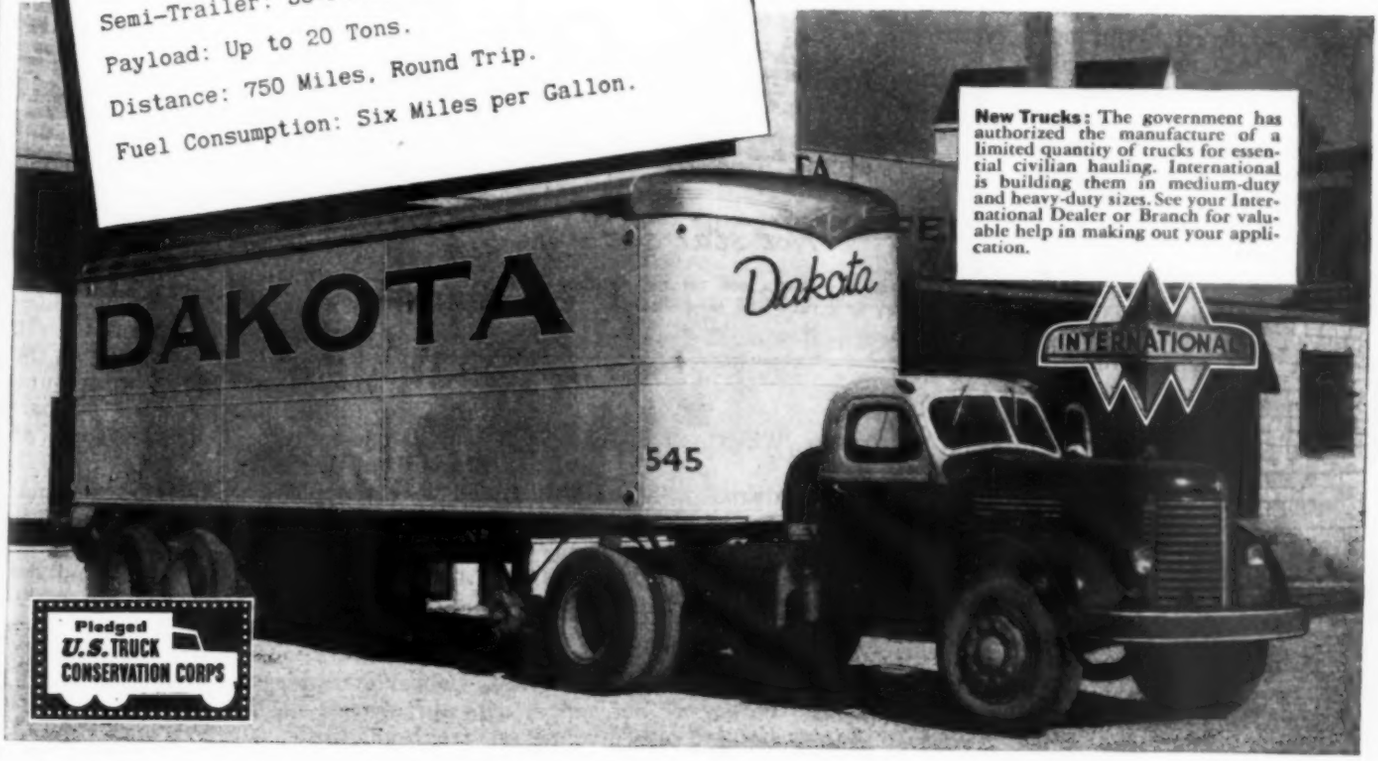

New Trucks: The government has authorized the manufacture of a limited quantity of trucks for essential civilian hauling. International is building them in medium-duty and heavy-duty sizes. See your International Dealer or Branch for valuable help in making out your application.

INTERNATIONAL *Trucks*

cracks. A length of chain around the drum with a screw jack will serve. If the drum is sufficiently oval to require straightening, it should be straightened in a press.

With drum round and held together with the chain, saw or grind a V of about 100° nearly through the wall from the outside, if the drum is cast iron, or chamfer out with a torch to 75°—90° bevel, if the drum is steel. Figure 12 shows the V cut in the flange of a cast-iron drum ready for brazing. It is not necessary to leave the opening at the bottom of the V as wide as is shown in the illustration. To clamp the drum while brazing, the chain puller was removed and a length of chain and an old screw jack was substituted.

The cast-iron drum is preheated locally to a dull red with the torch before the brazing operation is started. A good strong bronze, such as Oxweld No. 25 Manganese or similar rod, is used after tinning the V with a flux, such as Peterson's No. 3 Special. Figure 13 shows the crack in the flange brazed and the crack in the periphery cut out ready to braze. Figure 14 shows the finished repair job ready for machining.

After the drum is brazed, it is advisable to reheat the whole brazed and adjoining area to equalize shrinkage strains and allow to cool slowly, away from drafts. When the drum is cool, it can be turned.

Cracks or breaks in the webs or back of the drum may be repaired by using ordinary brazing method.

ADAPTING BRAKE SHOES AND LINING TO RECONDITIONED DRUMS:—Brake shoes should be generally inspected for worn bushings or anchor-pin holes, worn cams or cam followers. Badly worn parts should be repaired.

Each lined shoe must contact the drum surface throughout the entire lining length for best brake operation. Therefore, when oversizing lining for a reconditioned drum application, each shoe must have added to the original lining thickness one-half of the amount turned out of the drum diameter. This can be done by using oversize lining or by installing a brake shim of the correct thickness between the lining and the brake shoe and is necessary in order to give accurate adjustment and full lining contact.

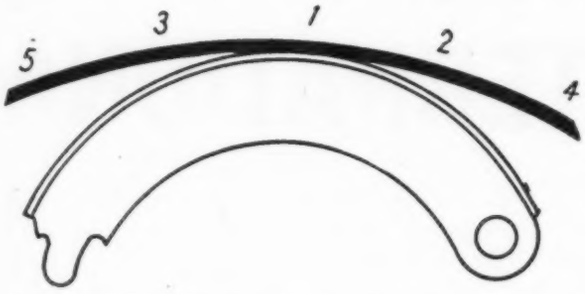

FIG. 16—When installing rivet-applied lining, the riveting should start at the center and work towards the ends.

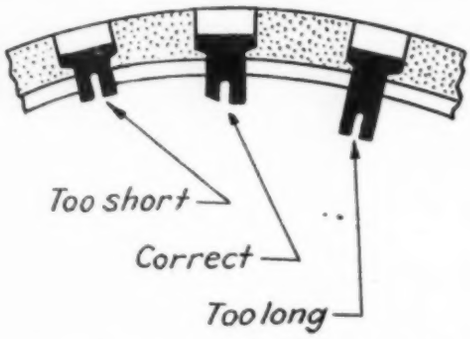

FIG. 17—Use correct rivet. Solid body of rivet should extend through the shoe, but no farther.

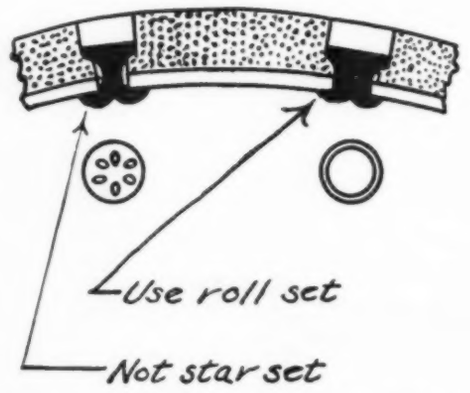

FIG. 18—Use a roll set for riveting. Star set may split tube and rivet would not fill the hole.

Care should be taken that brake linings and brake shims, where used, are installed on clean brake shoes, with all the rust and unevenness removed from the faces of the shoes. Lining and shim must fit the shoe tightly and should be applied so as not to allow greater than an 0.005 inch gage to be inserted between lining and shoe as shown in Figure 15.

With linings below ½ inch in thickness, an advantage may be gained through the use of cement in application. The cement used for this purpose should not be affected by heat or moisture.

Lining above ½ inch in thickness is usually referred to as "brake block" and is generally furnished in segments secured to the shoe by bolts (with lock washers) or by rivets. When secured by rivets, care should be taken in drilling and counter-sinking the lining. When using drilled and counter-sunk lining sets the riveting should be started in the center of the strip and continued in order toward each end of shoe, as illustrated in Figure 16. In some cases, the holes in the drilled and countersunk sets may not line up perfectly and it may be necessary to elongate some of the holes near the ends of the lining.

Brass is found to be the most satisfactory rivet material for fastening brake lining to shoes and is recommended for use whenever possible. Iron and steel are the strongest, but are abrasive to the drum surface. Therefore, they should be used only when great strength is necessary and, when used, care should be taken to insure against their touching the drum surface. Copper and brass are next in strength, but copper acts abrasively and, though strong, should be avoided on steel brake drums.

Brake lining rivets should be of the semi-tubular type. The rivet shank should fit the hole and the solid body of the rivet should extend through the shoe, but

(*Please turn to page* 146)

Meeting the Challenge of the Emergency:

GENERAL TIRE DEALERS ARE GIVING TRUCK TIRES RECAPPING PRIORITY

At the outset of the present truck tire emergency, General Tire Dealers from coast-to-coast threw their entire recapping facilities into the fight to keep America's vital trucks rolling.

And, General Tire Dealers promised truck operators that their tires would get priority over passenger tires in General Dealers' shops.

Now, thousands of operators know that General Tire Dealers meant what they said—that these experienced truck tire experts have backed their words with action, and are:

. . . giving *top priority* to tires off trucks lacking adequate spares.

. . . working day and night, to the full limit of their manpower and mold capacity to keep trucks from being laid up.

With the largest and most modern recapping plants, in most communities—experience in recapping dating from long before Pearl Harbor—skilled personnel, qualified to give maintenance advice and who know how to repair tires *right*—General Tire Dealers stand ready to help *you* in any way they can.

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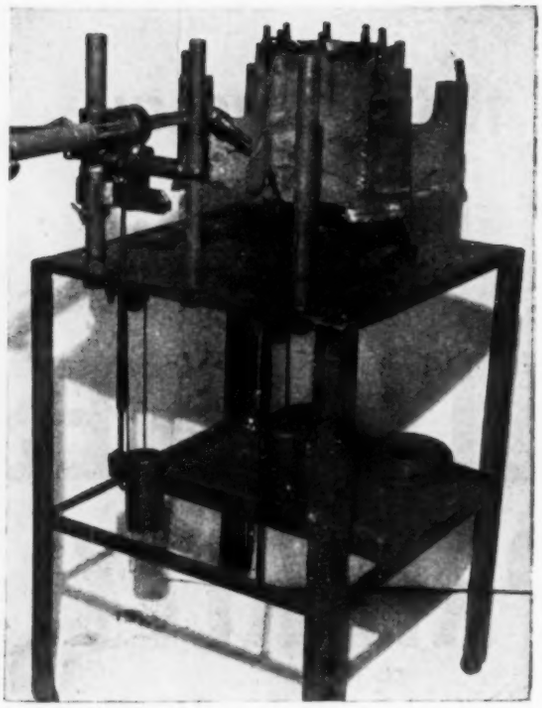
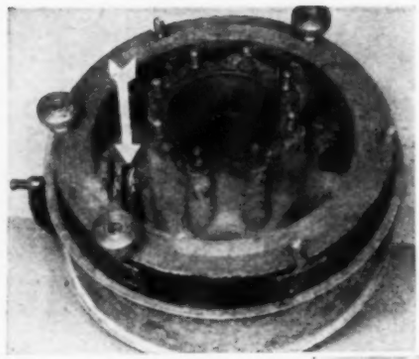
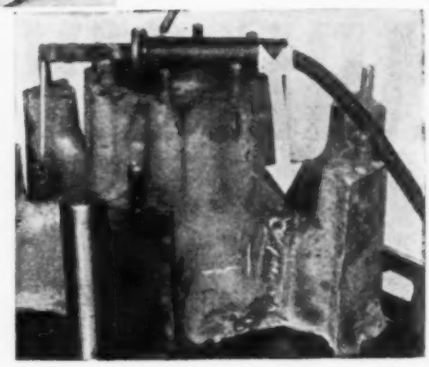


LEFT: Home-made fixture for cutting out broken sections and spokes of cast-steel truck wheels accurately, to insure interchangeability. . . . A full set of instructions for building this set-up will be found in the text of accompanying article. — Editor.





THESE two shots show the wheels as reclaimed. The top view shows the new sections tacked in place; the lower one shows the completed wheel ready for use. . . . The author states that he is able to reclaim 50 percent of all wheels that would ordinarily be junked, and that reclaiming operation costs but 6 percent of a new wheel's cost.

HOW WE SALVAGE TRUCK WHEELS

HOME-MADE FIXTURE ENABLES US to CUT OUT BROKEN SECTIONS of CAST-STEEL WHEELS and WELD IN SPOKES OBTAINED FROM OTHER BROKEN WHEELS

•

By Clinton Stutter,
Foreman of Mechanics,
Department of Sanitation,
City of New York, N. Y.

IN September of 1941 a representative of a truck wheel manufacturer visited our shops on a routine business call and while walking through our machine shop, he noticed a pile of cast-steel rear wheels which were awaiting repairs.

He advised us to hold on to them, as it would be practically impossible to obtain replacements, due to what was then called the "national defense" program. He also explained that his company was salvaging a great many of such wheels, by cutting them down and welding a complete new felloe ring to the old hub and spokes.

It so happened that in the pile of old wheels in our shop, each one would have one or two broken, missing, cracked or twisted spokes and after looking them over the wheel man said, "Well, we can't do anything with those."

That set me to thinking: "Why can't we save some of these?" We reasoned that if a wheel had only one or two broken spokes, why couldn't we cut those spokes out and replace them with good spokes from other wheels which have three broken ones? In that way we may be able to save at least 50 percent of these wheels, which, heretofore we would have junked.

We knew, of course, that this would require a jig or fixture, so that we could cut the spokes accurately enough to be interchangeable. The jig was designed and built in our machine shop shortly thereafter. There were no elaborate drawings or blue-prints. I laid the basic set-up out on a large piece of black cardboard, marking the various dimensions in full scale with chalk. This permitted easy erasures and changes, which were numerous. The accompanying photographs and the following description will, I trust, convey the idea comprehensively.

The bed shown in the large picture is a piece of half-inch boiler-plate, 22 inches square. This sets in an angle-iron tray, made of 1 x ⅝ x ⅛-inch angle-iron. The legs are made of 1¾ x ⅛-inch angle-iron, 30 inches high, and braced about half way down with the same size angle-iron used for the tray. The frame is arc-welded into one unit, but the bed-plate is removable.

Four old steering-arm balls are welded to the legs, to facilitate moving the unit. The center shaft is a piece of cold rolled steel 1½ inches x 6 inches; this is centrally located in an old 5¾-inch o.d. thrust bearing, which is protected from flying oxide by a steel ring ¼-inch thick by 1 inch high. A guide plate to fit the hub bore of the wheel and center stud is placed over the thrust bearing. A stop to locate the wheel through any of the brake drum bolt holes is provided with a removable pin.

The outside cutting torch carrier guides are 1¼-inch round stock, 14 inches high above the plate. The center guide is $^{15}/_{16}$-inch round.

The torch carrier presented the greatest problem. Motion in all directions was necessary and has been provided, vertical, horizontal and lateral. The torch

(*Please turn to page* 132)

He's not too particular what make of truck

...*as long as it's* DIAMOND T

PAUL MILLER of Los Angeles bought his first Diamond T truck in 1937. It was a Model 352, second-hand, with plenty of mileage on it when he got it. And this old Model 352 gave Paul a full half-million miles more of dependable, low-cost service before it came to an untimely end.

So the M & M Company had to replace it, and there was one thing sure about the new truck—it would be a new Diamond T.

Here it is—Model 614H. It hauls perishable foods for the Army and Navy to army camps and ports of embarkation, and its reliable, economical on-schedule performance is daily proof of the value of Diamond T's in-built stamina and rugged dependability.

Leading operators all over America have made Diamond T their choice for every type of service, from metropolitan pick-up and delivery to cross-country hauling. The performance that has built this reputation will be even further improved in the new and finer Diamond T's to come.

Diamond T has been authorized to build a limited number of commercial trucks at this time. See your Diamond T dealer if your service qualifies for Rationing Board approval.

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Alcoa knows, when they recommend a new piston design, that it's able to take punishment—the wallop on its head of exploding gases, accompanied by an inferno of heat, the rapid reversal of stresses each round trip down and up the cylinder.

How does Alcoa know? The stress-analysis laboratory is set up to pretest piston design, just as was done for the aluminum casting shown in the above photograph. In this case, the rib was found to be a "stress concentrator". Having determined that fact, the fault was corrected by altering the design, and the part performs perfectly in service.

This is the kind of engineering research which has gone into the development of Alcoa's products. It will continue to assure you of the best when you specify LYNITE* LO-EX Pistons. ALUMINUM COMPANY OF AMERICA, 2161 Gulf Building, Pittsburgh 19, Pennsylvania.

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LYNITE LO-EX PISTONS . . A PRODUCT OF

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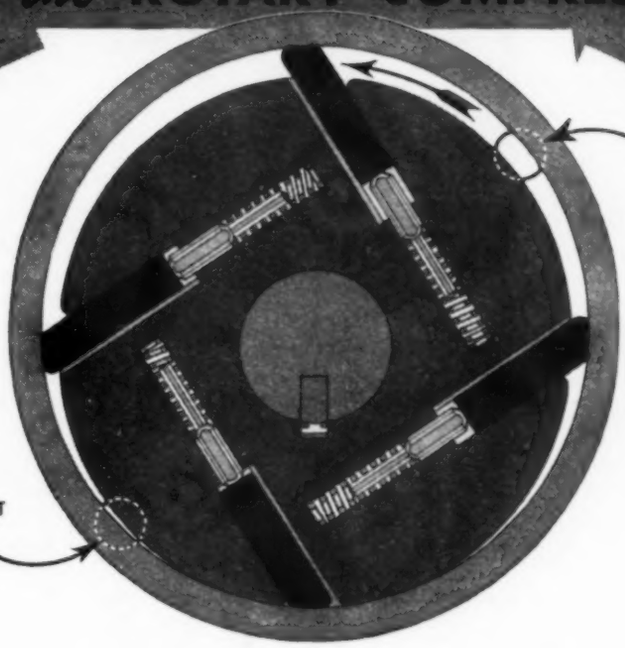

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The Wagner Rotary Air Compressor used in Wagner Air-Brake Systems is one of the outstanding developments achieved in the field of automotive air-brake equipment. This revolutionary type of air compressor utilizes the rotary principle to compress the air needed in the air-brake system, and its high efficiency is largely responsible for the absolute dependability of Wagner Air Brakes.

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1. Rotary Motion.
2. Perfect running balance at all times.
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8. Self-contained oiling system—consumes a minimum of oil.
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10. Low operating temperature prevents carbon formation in the compressor and delivery lines.
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Thousands of Wagner Air Brakes are giving outstanding service on trucks, tractors, trailers, and buses—and are establishing enviable performance records. You, too, can lower brake maintenance and increase the brake efficiency of your vehicles by installing Wagner Air Brakes. Wagner is a national organization and can render field engineering service from any one of its 25 branches located in principal cities.

K44-5

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ESTABLISHED 1891

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AUTOMOTIVE AND ELECTRICAL PRODUCTS

ENGINE BEARINGS

HOW TO MAKE BEST USE OF WARTIME BEARING SUBSTITUTES, WHICH MAY CALL for DIFFERENT INSTALLATION and OPERATION TECHNIQUES

By Hoy Stevens

THE quality of so-called "wartime" engine bearings is a subject which has been very much confused. The following general classes of materials have been used as engine bearings—during both the pre-war and the current wartime periods: (1) High-tin babbitt. (2) High-lead babbitt. (3) Cadmium-silver. (4) Cadmium-nickel. (5) Copper-lead. (6) Copper-lead, indium plated. (7) Copper-lead, lead-coated.

The outbreak of war had an immediate impact upon the manufacturers' use of three of these materials; cadmium, tin and copper. The nation's stockpiles of these materials were small as compared with the potential demand. Severe limitation orders were imposed upon cadmium, tin and copper. As a result, the use of these materials for civilian automotive purposes was severely restricted. There were searches for substitutes.

High-lead babbitt was an available bearing material which did not require as much critical metal as other alloys and which had been used as a bearing material in many severe applications. For example, the railway freight car journal bearings of the country are made of high-lead babbitt; also, the Chevrolet Motor Division has been using high-lead babbitt as an engine bearing material since before the outbreak of the war.

High-lead babbitt has not been a substitute for all uses, as you are doubtless aware, but it is a usable material and has given good service where its limitations were not exceeded. Also, as with any bearing, it needs careful installation and good handling.

The original tin limitation order also restricted the tin content of the bonding solders used on steel-backed or cast-in-place bearings. This resulted in some manufacturing difficulties and accounts for some bad cases of poor adhesion between the lead babbitt and the steel. Last fall the tin situation improved and, from that time on, proper bonding solders have been available to the manufacturers. At this time, any premature breaking away of bearing material from backing should not be blamed on a shortage of good bonding solder.

The supply situation of bearing materials can be briefly summed up as follows:

(a) Copper is available for the manufacture of copper-lead bearings, but the manufacturing facilities are heavily loaded. Some new facilities will be brought into production before long, but it is not likely that these will completely supply the demand for all hard-alloy bearings.

(b) The tin supply is considerably improved, so that tin babbitt may be available to a greater extent for all commercial vehicles, where this type of babbitt may do a better job.

(c) The cadmium supply situation is still very critical. Allotments have been made to two bearing manufacturers for use during the current quarter for Ford engine bearings. Some secondary cadmium has been used for other types of bearings. Facilities are available for the use of this material.

From the supply situation, it is obvious that the search for suitable bearing material substitutes is still in full progress. There have been reports of one or two new mixtures nearly ready to solve the bearing problem, but as yet production has been so small that at this time we are still depending on the alloys and mixtures listed above.

The critical supply of cadmium and the rather tight supply of tin means that these two materials must not be used where another bearing material can be substituted, even at some sacrifice of performance, and they must be used only in commercial vehicle engines.

Limitations of Babbitt Bearings: To what extent, then, can the lead-babbitt bearings be used in place of the harder alloys? From the physical characteristics of the different materials (which have been published by others), it cannot be expected that high-lead babbitt or even high-tin babbitt will be an equivalent substitute for the harder-alloy bearing materials. But the babbitts can be satisfactory substitutes when engine operating conditions and output requirements do not develop loads, speeds and temperatures in excess of the characteristics of the babbitts.

A number of vehicle manufacturers have indicated that lead-babbitt was a very satisfactory substitute in their trucks and, in these cases, most of the problems seem to be a matter of proper installation. In the case of the Ford truck engines, the babbitts have not been generally successful, and that has been the reason for the allotments of scarce cadmium. However, the Ford connecting-rod bearing design is radically different from other engines, so that the babbitt experience on Ford truck engines should not be taken as a criterion regarding the use of babbitt on other types of engines.

Although the cadmium and copper-lead types of bearings have advantages in many types of engines, they are not a panacea for all bearing troubles. As a matter of fact, since the hard alloys are not available in sufficient quantity, the babbitts, both high-lead and high-tin, will have to be used extensively. In many cases, where the use of babbitt bearings is necessary, you may have to reduce engine speeds and loads in

(*Please turn to page* 86)

Take your choice— *Oil* takes a beating or your motor must!

SHOP FOREMAN: *"Mr. Brown, our buses are taking an awful beating ...double shifts...terrific mileage... I can't keep them in the shop long enough for a decent overhaul job!"*

SUPT. OF MAINTENANCE: *"Sure, Joe. That's one reason I'm changing to Quaker State HD Oil...it will give our buses a better break... and make things easier for you."*

IT'S amazing what a motor vehicle will take. But there's a limit. Your machines must wear out sooner or later, and if you lubricate them with ordinary oil it probably will be sooner.

Oil is made to protect bearing surfaces. The more wear the oil can take, the less wear these surfaces get. And in these times there is plenty of wear to be taken.

That's why Quaker State HD Oil was made. It lubricates better. It takes more wear. It lasts longer. It withstands heat better. And because it contains a special detergent, it keeps motors cleaner.

Whether you have buses, trucks, or other motorized equipment to worry about, you'll worry less if you use Quaker State HD Oil.

Speed the Victory — Back the 6th War Loan

QUAKER STATE HD OIL

AND QUAKER STATE SUPERFINE LUBRICANTS

Quaker State HD Oil for your trucks, buses and tractors

Pledged U.S. TRUCK CONSERVATION CORPS

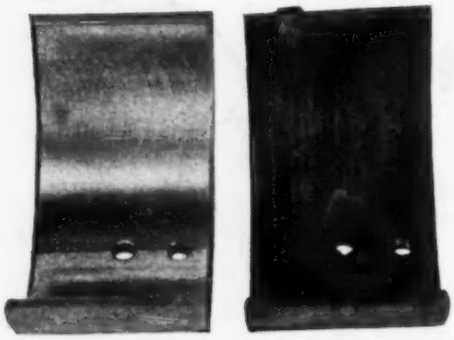
Quaker State Motor Oil for your passenger cars

QUAKER STATE OIL REFINING CORPORATION • OIL CITY, PENNSYLVANIA

order to obtain reasonable service life.

Since it is necessary to use babbitt bearings, it is more essential than ever that the installation of the bearings be made as meticulously as possible.

Identification of Bearing Materials: When newly manufactured, the two babbitt-type materials and the two cadmium-type materials look very much alike and are not easily identifiable from their appearance. In addition, during the earlier hurry of substitute manufacture, some substitute materials were sold in packages and under part numbers previously used for harder-alloy bearings. Even at present, there exists some confusion in labelling, so that it is not possible in some cases, to easily identify the type of bearing material from the markings or the part number on the box or bearing. After a bearing has been used, it is still more difficult to identify the material, except that the high-lead babbitts usually turn dark.



NEW and substitute bearing metals look pretty much alike. After a bearing has been used, however, it is still more difficult to identify the material, except that high-lead babbitts often turn darker.

The desirable journal-to-bearing clearance of the different materials varies to a considerable extent and, if one is unable to definitely identify the bearing material, it is very possible that installations may be made with the wrong clearances and as a result, the new bearings may have "two strikes" against them when the engine is first turned over.

Fitting of Bearings: With very long use, the big end of a connecting-rod may increase in size as well as distort in shape. This tendency varies with different designs of connecting-rods and the loads to which the rods have been subjected. The method of checking the roundness of the big-end opening is outlined in an ODT-SAE bulletin published last year, but methods of correcting possible increases in opening size were not described. (See p. 44, March, 1943, FLEET OWNER.)

Figure 1 shows an exaggerated view of one condition which develops in big-end bores. The cap bends and distorts inside the cap bolts and this results in an increase in the lengthwise diameter of the bore (Dimension B). This increase in one diameter results in an increase in the circumference of the bore.

When a condition like this exists, let us consider what happens when a simple replacement is made of two shell bearings. The outside circumference of the two shells is held to as close tolerance as possible by the manufacturer, for reasons of interchangeability. The outside circumference of the two shells is made a little larger than the inside bore of the connecting-rod, in order that there will be some "crush" on the bearing shells to insure intimate contact for good heat-transfer between the shell backs and the rod.

Now, when the inside circumference of the rod bore is increased, it is obvious that the original complete and intimate contact between the shells and the rod no longer exists. Contact may be spotty so that casual inspection may disclose no apparent looseness of the bearing shells. However, oil will seep into the areas where there is poor contact and will act as a heat insulator and so develop local hot spots in the bearing lining.

The condition which is produced is very similar to that which results when dirt particles are permitted to remain between the shell and its supporting perch. Where bearings are being operated very close to their maximum permissible teperatures, such areas of no contact prevent rapid and uniform transfer of surface bearing heat into the larger mass of the connecting-rod and permit local hot-spots in the bearing surface, which start the bearing on its way to destruction.

There are three combinations of shell bearings, shims and connecting-rods in general automotive use:

1. Shell bearings with *no* shims between the cap and the connecting rod.
2. Thin-shell bearings with shims between the cap and the connecting-rod, but with *no* shims between the butt ends of the shell bearings.
3. Thick shell bearings with shims between both the cap and connecting-rod and between the butt ends of the shell bearings.

(*Please turn to page* 134)

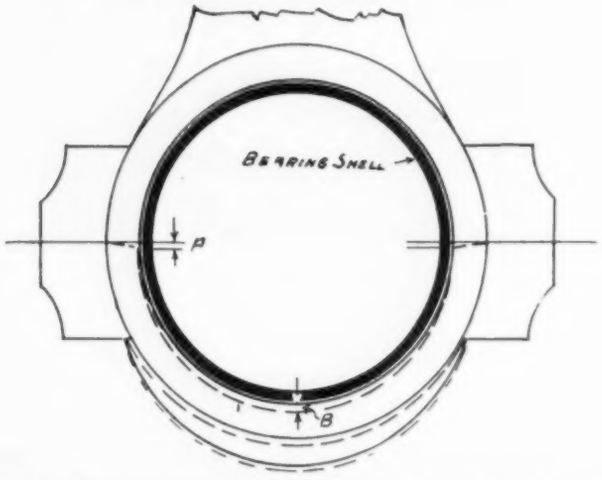


FIG. 1—How conn.-rod big ends often "grow" in size. This is usually an increase in the lengthwise diameter of the bore (B).

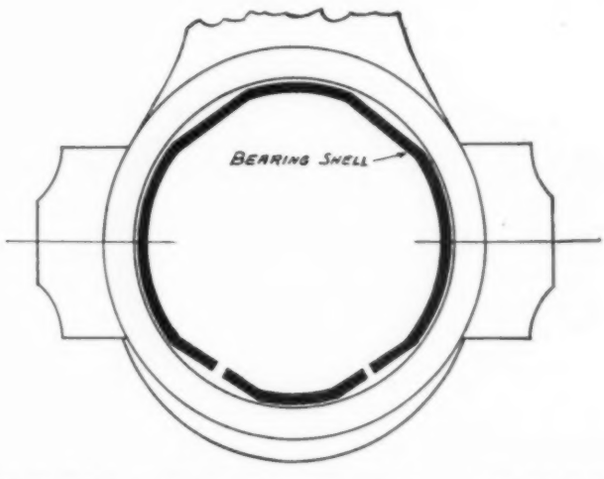


FIG. 2—What can happen from "over-crush". . . . This job lasted but 5,000 miles, when the bearing shells cracked, as shown here.

1 PORUS-KROME applied to the cylinder walls of gasoline and Diesel engines multiplies the life of the cylinders from 4 to 20 times.

2 PORUS-KROME on the cylinder walls multiplies the life of the ordinary piston rings from 3 to 5 times.

3 PORUS-KROME, with its thousands of tiny pores and channels which hold lubricating oil and feed it back as needed, improves lubrication and holds lubricating oil consumption at a constant low level.

4 PORUS-KROME and piston rings wear so slowly that high power development is maintained for many more hours . . . many more miles . . . than with ordinary cylinders.

5 PORUS-KROME means greater engine reliability because it reduces scoring and scuffing and the risk of piston seizure and because it cuts down the number of overhauls caused by cylinder and ring wear.

All of these advantages add up to a substantial saving in engine operating costs.

VAN DER HORST

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PORUS - KROME

Good for the Life of your Engines

* PORUS-KROME is pure, hard chromium which is applied to cylinder bores by the patented Van der Horst process. It has tiny pores and channels in its surface which serve as reservoirs for lubricating oil, feeding it back as needed. It reduces corrosion and wear and multiplies cylinder life 4 to 20 times.

VAN DER HORST CORPORATION OF AMERICA OLEAN • NEW YORK CLEVELAND 11 • OHIO

AN AFFILIATE OF DRESSER INDUSTRIES

RADIATOR CONDENSER-TANK HELPS SAVE ANTI-FREEZE

AUXILIARY DEVICE to CATCH RADIATOR OVER-FLOW CAN BE BUILT in SHOP at SMALL COST

BACK in the days of 1937-38, many fleet operators found that by installing a small, auxiliary tank under the hood, to catch radiator vapors and overflow, as illustrated in the above photograph, they could use virtually any of the so-called evaporating types of anti-freezes (alcohols) with practically no loss, and at a considerable reduction in costs over former practices.

Today, with permanent-type anti-freezes seriously short in supply, and difficult to get in many locations, plus the fact that there's not going to be an "over-abundant" supply of the alcohol types—if not an actual shortage as the winter gets on—it might be timely to review this subject and see whether or not we can add to our list of wartime conservation measures by conserving precious anti-freeze in this particular manner.

Fred Lewis, we believe it was, of Dayton Power & Light Company, was among the first to supply the details of such an outfit, which he had built at that time and which he has since used quite successfully in his fleet. After that, the idea was taken up by many fleet operators as a cost-cutting (if not a conservation) measure. ODT men have suggested that operators again give this idea some serious thought, and have asked us to make a *new* presentation on the subject, which results in this article.

The outfit as designed by Mr. Lewis consisted of a simple tank, with a pipe connection at one end (located at the bottom) and a vent hole drilled in the top, plus the usual hose connections and a special (home-made) radiator cap. For simplicity's sake, let us quote from Mr. Lewis' 1938 report:

"We started out by hanging a one-gallon tank to the radiator stay-rod and connecting this to the existing over-flow pipe. This we found was not very satisfactory, due to the fact that the over-flow pipe on some vehicles was very difficult to get at. Also, we were not able to maintain an air-tight seal with the regular radiator filler-cap, this being absolutely necessary, as the function of this device depends upon the vacuum created in the radiator.

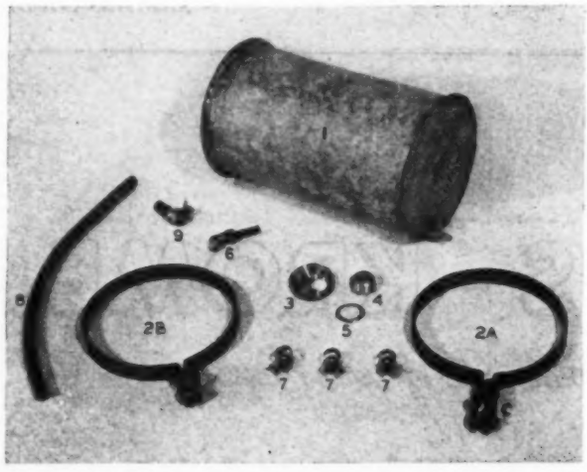
"Our next step was to design and build a special tank and to work out a simple means of replacing the regular filler-cap of the radiator in order that an air-tight connection with the tank could be made. The final assembly, as worked out, is shown in the photograph. After installed, it is necessary to plug up the regular over-flow pipe of the radiator, at the most convenient point.

"The purpose of this radiator-surge or condensing tank is to prevent the loss (by evaporation, surge, boiling-over, etc.) of radiator-water and valuable anti-freeze solutions. The tank is made of 26-gauge galvanized iron and has a capacity of about five quarts. It is mounted as shown in the large photograph, and is vented by drilling a small, 3/16-inch hole at the top of the rear end. At the bottom of the front end, a short length of copper-tubing is soldered in, to accommodate the connecting hose.

"In place of the regular filler-cap of the radiator, a special flat brass cap is used, soldered fast to the neck of the radiator. This is made of 1/4" stock, and is drilled and tapped to take a 7/8-inch filler-plug, and a 1/8-inch L-fitting with a short length of 5/16-inch copper tubing attached.

"A suitable length of rubber hose is slip-

(*Please turn p.* 141)



ONLY a few parts are needed to complete the tank installation. Reference to the numbers is made in this article.

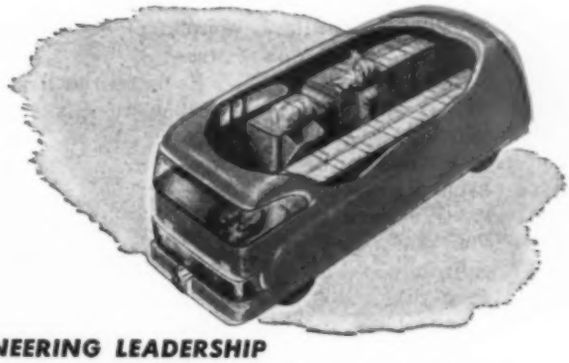
FROM A DESIGNER'S SKETCH-BOOK

Specialized trucks, each designed for one particular type of load and service, will be an important element in America's highway transport program after the war.

One possibility for such a truck, for bulk inter-urban deliveries of metropolitan newspapers, is illustrated above. Today, this truck and many other new designs exist only in designers' sketch-books. Tomorrow, many of them will be realities.

Radically new designs cannot be expected the moment full-scale production is resumed, but many specialized types, based upon standard chassis models, will undoubtedly be built from the start.

Regardless of the size, shape or design of the improved trucks of the future, axles must *carry* the load, *move* the load and *stop* the load. And when the new and better vehicles of tomorrow are ready to go into production, Timken will be ready with improved axles and brakes to meet the needs of these super-vehicles for super-highways.



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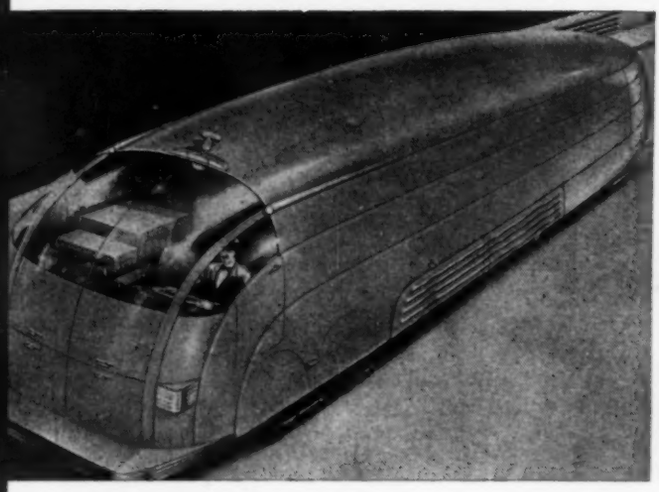
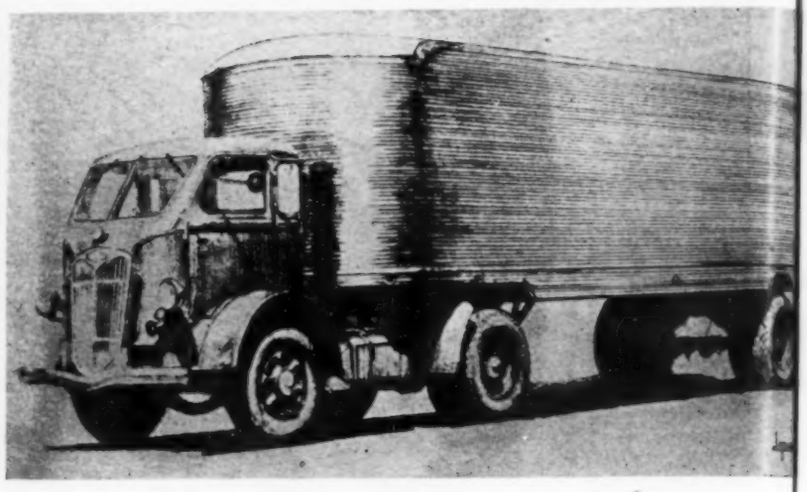




WILL IT BE THIS? . . . . . OR, WILL IT BE THIS? . . . . . .

POST-WAR TRUCK DESIGN

TRUCK ENGINEER SEES TWO-WAY RADIO and MANY MECHANICAL CHANGES, RATHER THAN RADICALLY-STREAMLINED DIFFERENCES IN STYLE or DESIGN

By Robert F. Cass,
Chief Engineer,
The White Motor Company

HAVING looked at the many illustrations which have been displayed in various advertisements and magazines in the last year to eighteen months as "post-war" trucks, I can't help but feel that this is a good time to say that I question seriously, first, whether anyone could be persuaded to build them as depicted, and second, whether manufacturers might not run the risk of being assassinated by the operators if they did build them.

The pictorial forecasts have in some cases gone wild. We have seen trucks with streamlining, so called, in all directions; we have seen them with the driver perched practically on top of the body. We have seen them designed from the point of view of driver vision, and we have seen them so designed that only radar could get the driver safely to his objective. This is merely our way of saying that there seems to be no excuse for our getting ourselves into post-war designs where style —and style only—is the important factor. After all, functionability must be stressed first of all, even though this functionability may occasion severe design lines, so far as appearance is concerned. Besides, our ability to make any radical changes is still entirely in the laps of the Gods, because the war effort makes it impossible to determine *when* any newly-designed trucks will appear on the market. Obviously, the timing of the production of post-war models may have a great deal to do with the emphasis on certain design features.

Perhaps the first thing we might discuss at this stage, to some degree tied up with style, is the question of the driver and his cab. We feel very strongly that determined efforts must be made within the limits of sound economics, which, of course, include cost and weight, to provide the ultimate in comfort for the man who spends his working day, sometimes many hours at a stretch, behind the wheel. Perhaps the three major things are his seat comfort, his vision for safety, and ventilation, which would include some form of air-conditioning and controlled heating, as the case might be. Some of these features are not easy to design, for a considerable difference of opinion exists as to what is most desirable in each case. The many types of service might well occasion a difference in thinking as to the seating and ventilation.

OR PERHAPS THIS? . . . . . .

Noise is also a tyrant yet to be properly subdued. How much can be done will depend on what insulation materials have become economically practical and durable, while possessing qualities to suppress noise and resist heat.

There have been many different types of seats and cushions used in past years, but as yet there seems to be no standard of comparison beyond the opinion of engineers and drivers, and they don't agree at all.

It has been suggested that we should endeavor within the industry to standardize cab arrangements much in the same way that the locomotive and commercial airplane people have done, but the difficulties to overcome before this could happen are great. Nevertheless, every effort is going to be made to improve the essential fea-

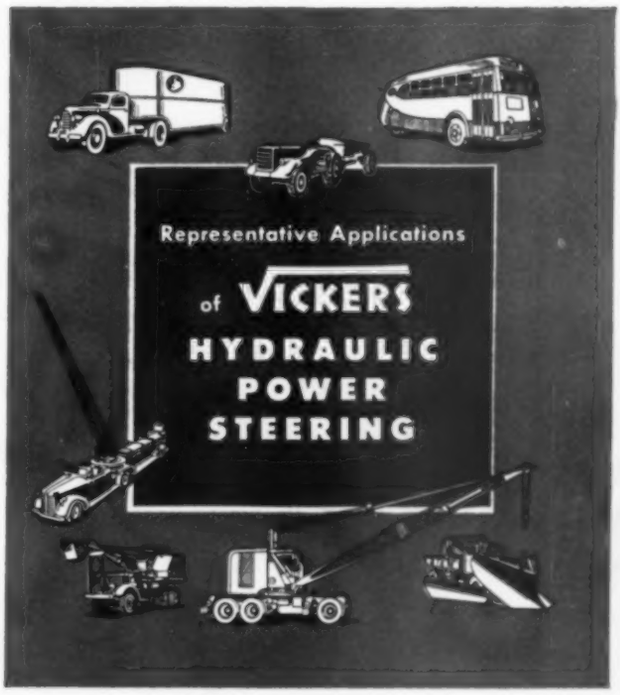
(*Please turn to page* 150)

RUGGED...

Another Feature of VICKERS HYDRAULIC POWER STEERING SYSTEM

Providing effortless, positive, and shockless steering of even the heaviest vehicles, Vickers Hydraulic Power Steering has been in use under the most adverse operating conditions for the last 14 years. The hydraulic system is protected against overload by the relief valve which limits the maximum hydraulic pressure of the system. The pump and booster are thus protected against damage from excessive pressure and the linkage system from abuse. With Vickers Hydraulic Power Steering, road shock thrusts are transmitted to the frame of the vehicle instead of to the steering gear.

Among the many other advantages of Vickers Hydraulic Power Steering are: greater driver efficiency by reducing fatigue to a minimum, easy application to existing chassis designs, wheel "fight" is impossible, greater road safety, and automatic lubrication. Ask for new Bulletin 44-30 for all the facts about the Vickers Hydraulic Power Steering System.



VICKERS *Incorporated*

1422 OAKMAN BLVD. • DETROIT 32, MICHIGAN

Application Engineering Offices: CHICAGO • CINCINNATI • CLEVELAND • DETROIT
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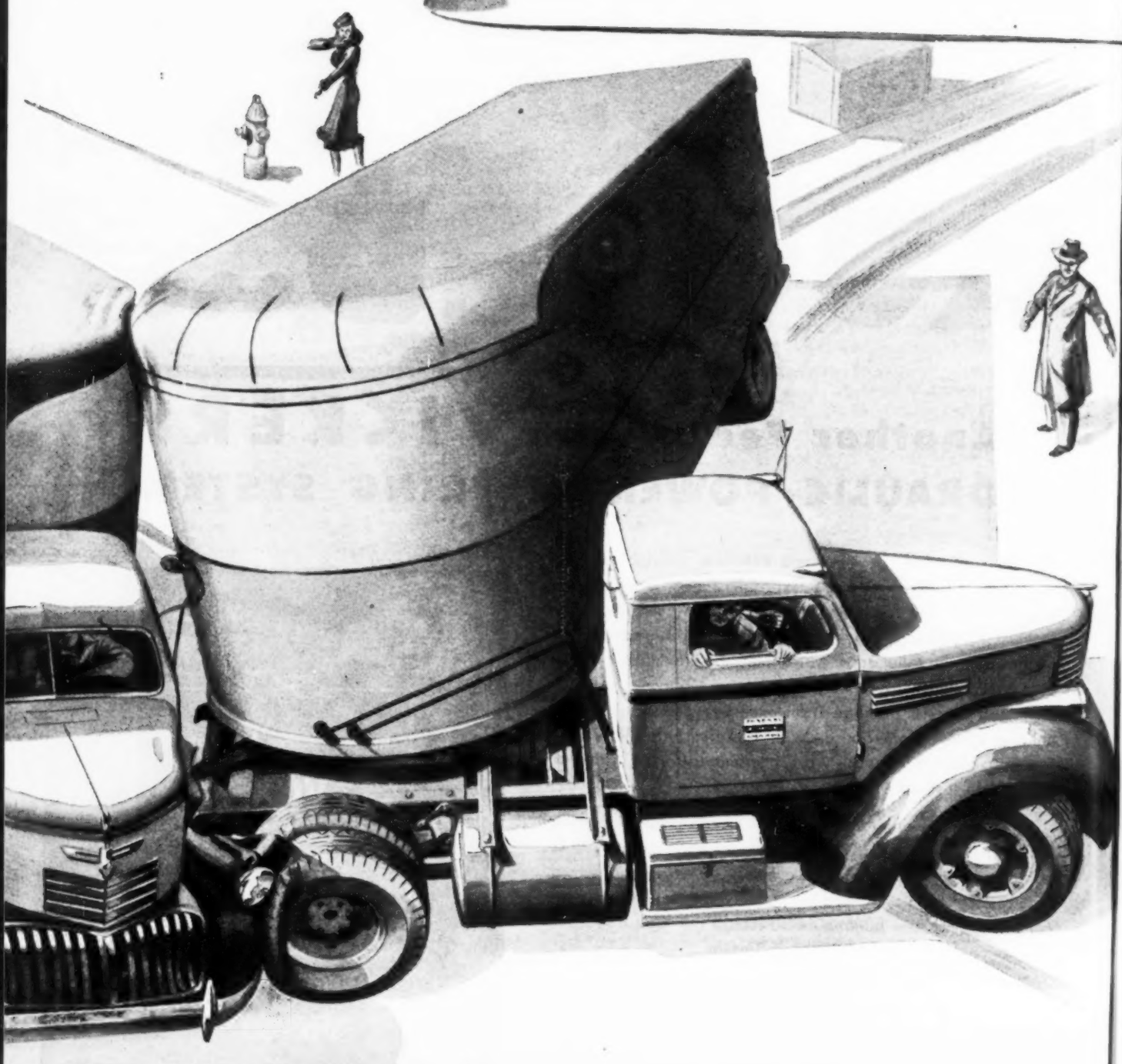
You can AVOID many costly

with

WARNER



ly delays due to Jack-Knifing

★ VARI-LOAD ★ ELECTRIC BRAKES

THERE are many times when it's plenty tough for even the most skillful and experienced driver to cope with road conditions that lead to jack-knifing of big tractor-trailer combinations. And he can't expect help from trailer brakes having a tendency to lag.

That's when Warner "Vari-Load" Electric Brakes really prove their worth. The *controlled action* of these simple, instant acting, efficient brakes materially reduces the chances of jack-knifing.

AND NOW . . . with Warner "Vari-Load" Electric Brakes PLUS the New WARNER CONTROLLER the driver has everything in his favor!

As soon as slippery road conditions are encountered, the driver can pre-set the "Vari-Load" dial on the dash—so it adjusts the Electric Brakes on the trailer to give correct braking to meet road and load conditions. Then foot pressure on the tractor's regular brake pedal activates the new Warner Controller which provides *complete synchronized operation* of the tractor's hydraulic brakes and the trailer's Electric Brakes. With this *absolute control,* all brakes "come in" at the same time—but with various *amounts* of power. Therefore, rear trailer wheels get the effect of coming in first—and tendency to jack-knife is prevented, thus giving protection to driver and load — and avoiding costly lost time due to wrecked equipment.

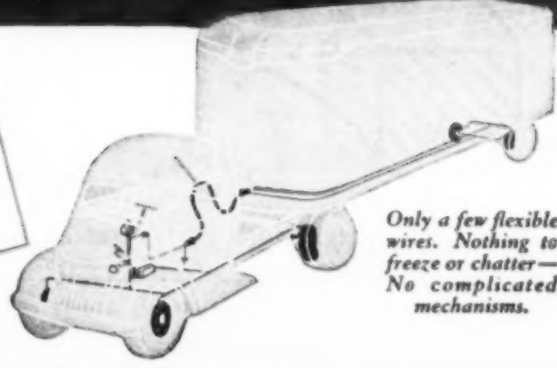
WARNER ELECTRIC BRAKE MANUFACTURING COMPANY · BELOIT, WISCONSIN

NOW — Present Owners of Trailers with Warner Electric Brakes Can Have This New WARNER CONTROLLER

The new Warner Controller — simple and compact — synchronizes the hydraulic brakes on tractor with the Electric Brakes on trailer. The tractor's regular foot pedal operates both braking systems. This development creates smooth foot-touch tractor-trailer braking under all conditions—eases driving strain—assures greater safety. Controller is easily and quickly fitted into hydraulic brake line. See your Warner dealer about changing over your present equipment.

FOOT PEDAL PRESSURE CONTROLS BRAKES ON BOTH TRACTOR AND TRAILER

WARNER
ELECTRIC BRAKES



Only a few flexible wires. Nothing to freeze or chatter— No complicated mechanisms.

A Non-Technical Resumé of Piston Ring Progress

PISTON-RING TYPES

•

By Melvin W. Marien,

Assistant Chief Engineer,
Ramsey Accessories Mfg. Corp.,
St. Louis, Mo.

BEFORE discussing modern piston ring developments, it might be well to briefly review the basic requirements of piston rings. All piston rings, in one way or another, are basically springs. The fact that a piston ring must be a spring is realized when we arrive at the conclusion that the piston ring must be a "compensating element" which automatically meets an uncertain specification.

A piston ring must maintain its contact with the cylinder wall, even though the diameter of the cylinder changes with variations in temperature, and even though the cylinder wall and the ring itself both wear slightly, even under normal conditions. If the above conditions did not have to be met, a solid, un-split ring or a piston without rings would meet all sealing requirements.

We do not have to go very far back to remember when the one and only piston ring type in common use was the plain compression ring having a rectangular cross-section. Since that time, however, there have been many developments in piston rings and we shall attempt to outline not only new developments, but also illustrate and describe the types which are in common use.

Of the compression ring types, the plain compression ring having a rectangular cross-section and uniform wall thickness is still widely used, (Fig. 1.)

A variation of this ring type is the tapered face compression ring which has the cylinder contacting face tapered .001" or .002" along the width of the ring, (Fig. 2.) Initially, the bottom edge of this ring contacts the cylinder wall. We think that the basic reason for a tapered face ring is that microscopically speaking, it is impossible to make a straight faced ring. Therefore, we taper the face of the ring and at least know just exactly what is going to happen, as far as the initial seating process is concerned. A tapered face is quick-seating and compensates for variations in the distribution of cylinder wall pressure. It provides a degree of oil-control until the oil ring has had an opportunity to become seated.

The third type of compression ring which is quite prominent is the torsion ring or bevel back ring, (Fig. 3). This type of ring has the upper inside corner beveled or undercut so that the cross-section is non-symetrical. When this ring is compressed to its operating position, the unbalanced stresses causes it to twist, and it twists in such a manner that the lower edge of the ring is presented to the cylinder wall with pressure. Thus, the action of this ring is similar to the tapered face compression ring. Another advantage claimed for this ring is that when it is assembled in the engine, its twisting or dishing action provides a better seal between the side of the ring and the side of the groove, thereby preventing blow-by behind the back of the ring. There is also a possibility of a dampening effect due to side friction which will prevent ring vibration and blow-by at high speeds.

A notable advancement in compression rings is the thick wall ring, (Fig. 4). Offhand, this would not seem to be such a remarkable development but it has become so important that two years ago the SAE set up standards for this type of ring. Its development was made possible by gradual development of higher strength piston ring iron. Thick wall rings are about 20% thicker than the conventional type. The wall thickness is usually 1/20 of the diameter, whereas the regular wall thickness rings have a wall thickness of 1/24 or 1/25 of the diameter.

The advantages of the thick wall ring are numerous. The first is

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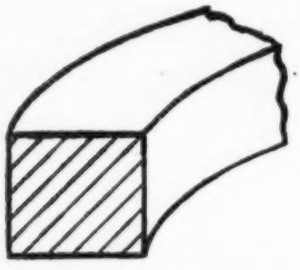

FIGURE 1
PLAIN COMPRESSION RING

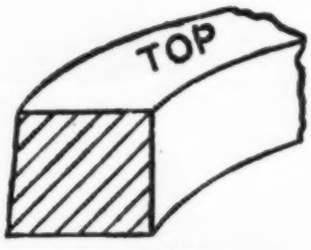

FIGURE 2
TAPERED FACE COMPRESSION RING

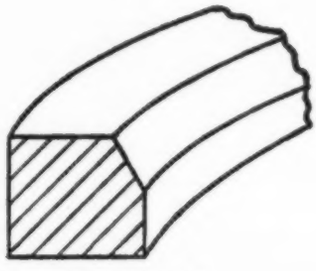

FIGURE 3
BEVEL-BACK COMPRESSION RING

The Power Braking Unit of the Future . .

. . Backed by a Brilliant Past!

COMPARE

It's *Simple*—a single, compact unit . . . *Easy to Install*—requires only 3 tubular connections . . . *Mounts anywhere* on the chassis . . . *Trouble-free*—completely enclosed, no external levers or links, no adjustment during or after installation . . . *Increases Safety*—delivers great power at a pedal touch, lets driver "feel" the brakes.

Hydrovac

POWER BRAKING BY

Bendix

Available *now!*

Tested in battle all over the world . . . combining more vital advantages than any other power braking unit . . . and available right now to qualified users, this great product from Brake Headquarters deserves a thorough investigation if you own, sell, or service hauling equipment. See your Bendix B-K dealer or write direct to the factory for details and prove for yourself that there's nothing in its field like Hydrovac power braking—nothing else so advanced, so efficient, and so thoroughly proved.

BENDIX PRODUCTS DIVISION OF BENDIX AVIATION CORPORATION • SOUTH BEND 20, INDIANA

"HYDROVAC" AND "BENDIX" ARE TRADE-MARKS OF BENDIX AVIATION CORPORATION

that it exerts a higher radial wall pressure, and blow-by at high speeds is minimized due to the fact that the higher pressure maintains contact. Also, the ring's natural period of vibration is higher and with less chance of ring vibration, there is also less chance of ring breakage due to fatigue. The higher tension is also likely to cut down the tendency for the ring to stick in the groove.

One of the most important functions of a compression piston ring is to transfer the heat from the head of the piston to the cylinder wall. As far as the rings are concerned, the limiting factor here is not the width of the ring but the radial depth of the ring. Thus, the use of thick wall rings may result in a cooler running piston and further decrease the possibility of ring-sticking.

The tendency for years has been for compression rings to become narrower and narrower. We should report that although only a few years ago 3/32" was the narrowest width, we are now down to 5/64" and 1/16th" widths in relatively large diameters. The reduced weight has resulted in lower inertia loads on the ring lands and the sealing ability has been improved rather than reduced.

A relatively new development in compression rings is the tapered side or wedge compression ring used in aircraft and truck engines, (Fig. 5). Instead of having parallel sides, this type of ring has tapered sides, the inclined angle of the sides being 8 degrees, 15 degrees, or 20 degrees. The SAE standard, set up about a year ago, is 15 degrees. This type of ring is particularly useful in solving ring-sticking problems. This is a case where the piston ring industry has had to help out the oil industry on its ring-sticking and other problems.

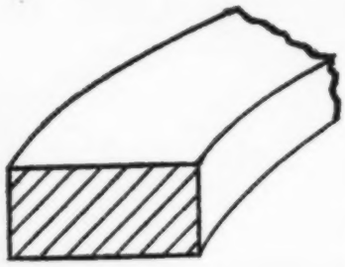

FIGURE 4
NARROW THICK WALL RING

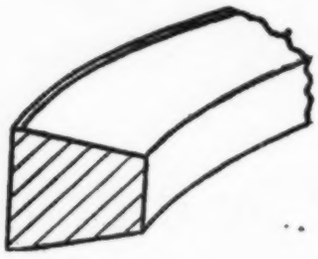

FIGURE 5
TAPERED SIDE COMPRESSION RING

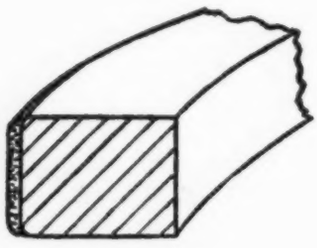

FIGURE 6
CHROME-PLATED RING

As this type of ring breathes in and out of the groove, the side clearance increases and decreases, which tends to break up carbon formation. Also, as this ring wears radially, the side clearance increases, and there is a possibility that the carbon formation does not have an opportunity to catch up with the increasing side clearance. The piston ring groove is cut at the same angle as the side of the ring and it is readily apparent that there is a side sealing movement or wedging action, similar to the sealing action of an ordinary engine valve. Thus, blow-by around the back of the ring is minimized.

This design also allows the groove and piston ring lands to be designed so that they are much stronger. The sides of the groove are tapered and the piston ring land becomes wider toward the center of the piston. The bottom of the groove instead of being made flat, is a radius, joining one side of the groove to the other. This is a remarkably strong land construction which minimizes the danger of ring land breakage.

During the past few years, ring coatings have come into prominence and among these we have the phosphate coatings, the cadmium and tin-plate coatings. These are all thin coatings designed to resist erosion and abrasion during the break-in period. They also provide very excellent rust-protection.

An outstanding development is the use of chrome-plated piston rings, (Fig. 6). Chrome-plate is applied only to the cylinder contacting face of the ring and the thickness of coating is usually .005". One of the causes of piston ring wear is corrosion and we all know that chromium resists corrosion to a very high degree. Chromium also seems to have a very low coefficient of friction and when properly applied, chromium-plated rings have resulted in lower cylinder wall wear.

The first chrome-plated rings were not successful because they scuffed and scored and chipped and

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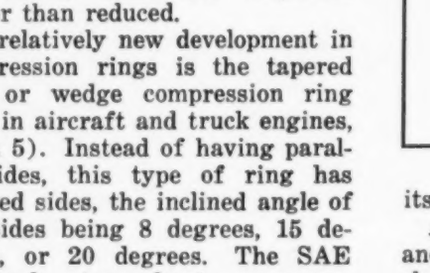


FIGURE 7
STEEL SEGMENT
COMPRESSION RING

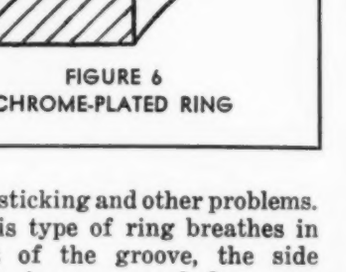


FIGURE 8
EXPANDER TYPE OIL RING

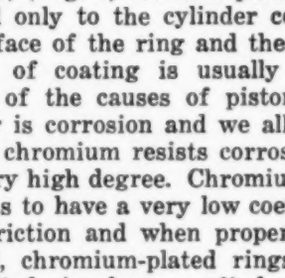
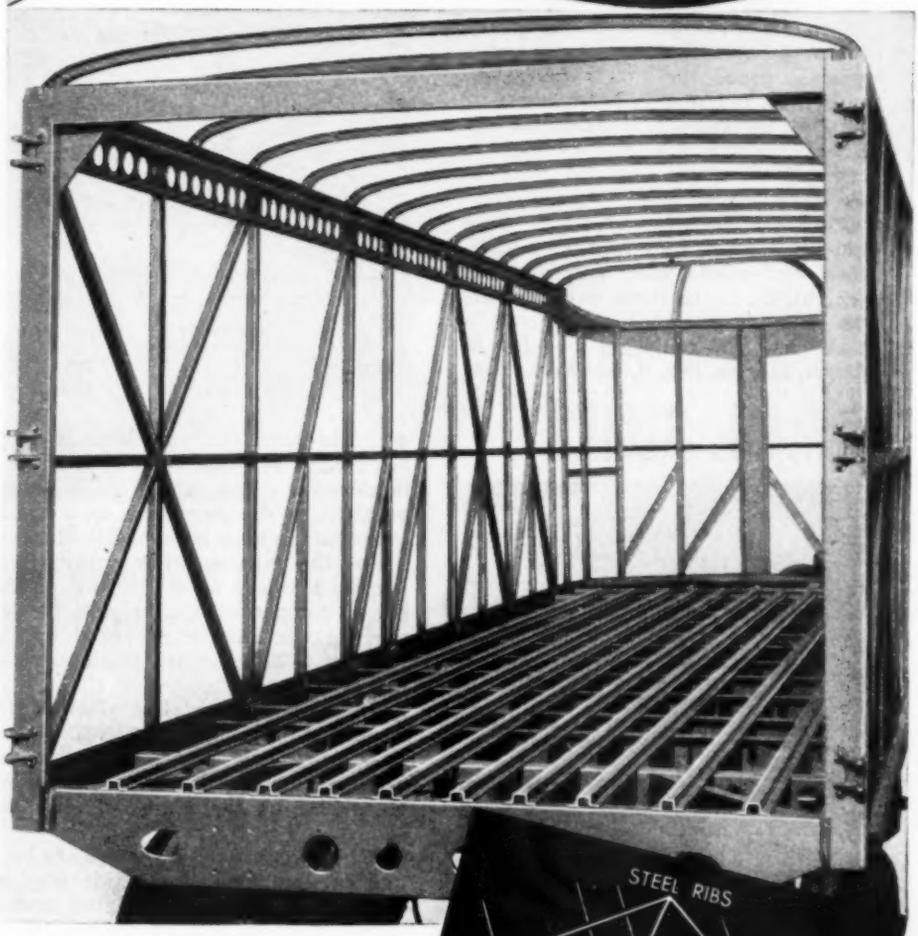


FIGURE 9
STEEL SEGMENT OIL RING

THE TRAILER FLOOR THAT GIVES YOU MORE THAN JUST A BETTER PLATFORM



This patented steel-ribbed floor design, for freight vans, is available only in frame-integral Trailers which carry the Fruehauf name.

YOU HAVE READ that the new Fruehauf **STEEL RIBBED** Floor gives you (1) 2½ times the strength of an all-oak floor of the same thickness—1,000 lbs. per sq. ft., to be exact... (2) freedom from buckling... (3) low maintenance cost because boards can be replaced individually.

You get all of these advantages —and, in addition, you get this extremely important feature which you normally wouldn't expect:

The steel ribs of the floor—10 high-tensile steel hat-sections running practically the full length of the Trailer, each securely welded to every cross-member—tremendously increase the strength, rigidity and durability of the entire Trailer structure!

The Fruehauf "Aerovan" airplane-type, frame-integral construction—in which each member of the entire Trailer "skeleton" carries its part of the load—is a development which has amply proved its worth in Fruehauf Trailers over the years.

And now, through the use of this new floor, a still greater margin of safety has been added to its load-carrying ability, its low-maintenance performance and its money-earning life.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER CO., DETROIT 32

Service in Principal Cities

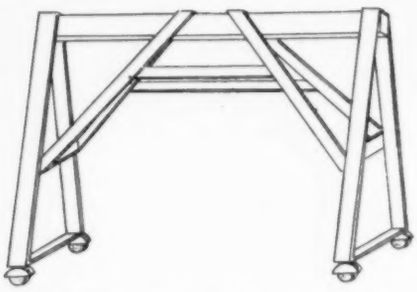
Get all the facts from your nearest Fruehauf Factory Branch, or write for the new 12-page fully-illustrated booklet—*"FRUEHAUF ELEVATING ENDGATE."*

FRUEHAUF TRAILERS

"Engineered Transportation"

HOME-MADE GARAGE HOIST

● Here is a sketch of a heavy-duty portable garage hoist made by



C. R. McQuiston, New Brighton, Minn. It was made especially to slip over the hoods of cars, trucks and tractors, to pull out motors.

All of the framework was made from scrap 4-inch seamless rectangular tubing. The casters are 6 inches in diameter, to facilitate moving around rough floors. A 3-ton chain hoist is used with this framework; it can be slid to any point on the cross-beam. The latter is an I-beam, 8 x 3 x ⅜ inches. There is a ½-inch plate, 18 x 28 inches, welded to the top of the I-beam.

The hoist was fabricated entirely by arc-welding, using "Fleetwood 7" rod, made by The Lincoln Electric Company, through whose courtesy this shop hint is presented.

●

GRIPE ABOUT GRILLES

● We operate a fleet of dump trucks and are, of course, unable to buy any replacement radiator grilles. As you know, some trucks are constructed so that the grille holds the rest of the front together—like the house builder who refused to take the scaffolding down until the wall-paper was on. At any rate, we are wondering what other operators are doing for replacement grilles? We have considered having some made by sheet metal shops.

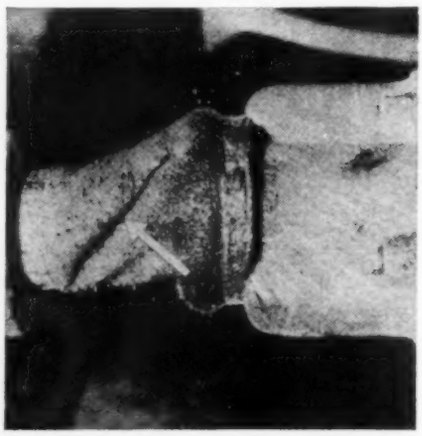
The WPB has a theory on this subject, namely: they consider a left front fender and windshield essential, but not so a right, since the left fender might protect the windshield from dirt, dust and mud thrown up by the wheel, obstructing the vision of the driver.

Perhaps WPB has another theory on how to hold the rest of the truck together, since the hoods fasten to the grilles, fenders, radiator caps, or whatever strikes the fancy of the designer?

Oh, if we could only go back to the days before the "gingerbread" was conceived—when fenders were mud-guards and radiators were radiators, and shells were cast-iron ¼-inch thick. . . . In those days a grille was something on which to cook a steak—and you could get it!—*Jay E. Harris, Harris, Inc., Little Rock, Ark.*

●

JOINTS NEED GREASE?



● On automotive equipment that comes with leather or fabric universal joint "boots" or covers, it is easy to tell just when the joint needs packing with fresh grease.

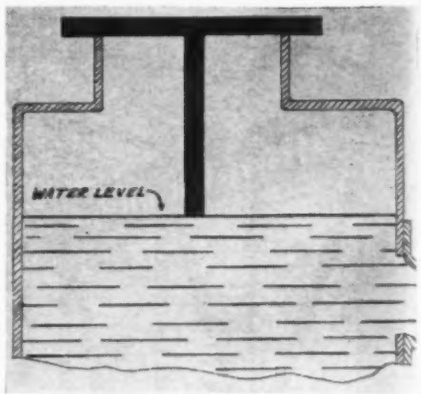
By grasping the drive-shaft next to the boot, and shoving, you can easily ascertain if the joint needs repacking. If little resistance is encountered, the joint is ready for disassembly for repacking—or a repair job. (A better way, of course, would be to strictly adhere to a predetermined P.M. plan.)

●

YOU MAY NOT BELIEVE IT

● American railroads own and operate more commercial motor vehicles on the highways than the number of locomotives that run on rails.

WATER-LEVEL CHECK



● In large fleets, where it may not always be practicable to check the liquid level at top engine driving temperature, a standard level at a lower temperature may be established.

For the purpose of maintaining a standard liquid level at any established temperature, a simple home-made gauge can be prepared in the form of a T, as shown in the accompanying sketch.

With the horizontal member of the T resting on the top of the filler-neck opening, the vertical member can be made of such length as to just touch the liquid at the standard level, as shown.

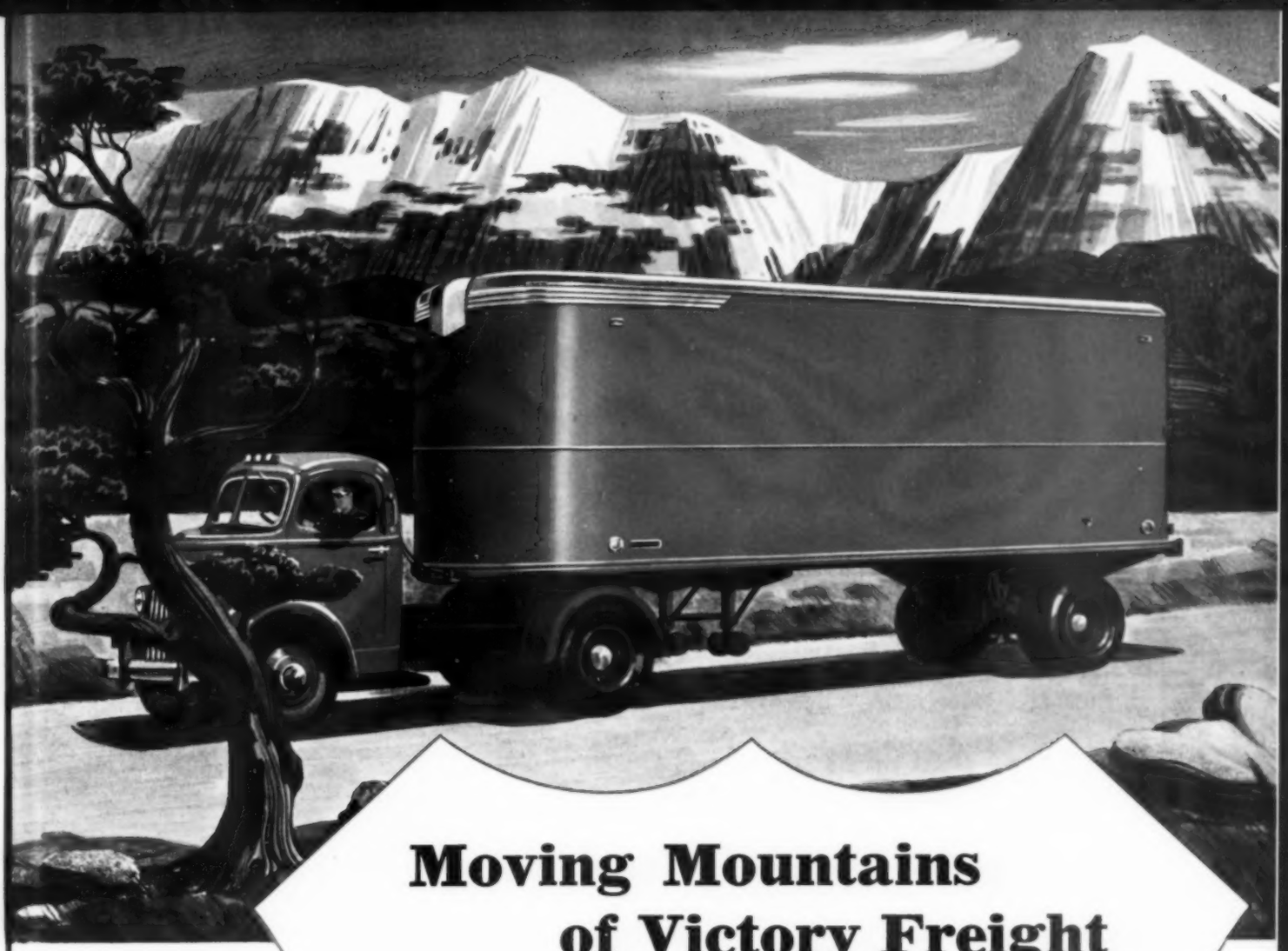
Where radiator filler-necks are long and curved, visual inspection may be impossible, in which case the installation of a pet-cock is recommended. The cock should be placed on the side of the top radiator tank, at a predetermined standard liquid level for a given temperature.

With the pet-cock open, the liquid level is adjusted to the point where the liquid starts to run out of the pet-cock, after which, of course, it is closed tightly.

●

YOU MAY NOT BELIEVE IT

● Air is pulled through the carburetor at extremely high speed. When a car is traveling at 70 miles per hour, air rushes through its carburetor at a speed of 250 miles per hour, or at a rate almost as high as the highest speed ever attained by an automobile.



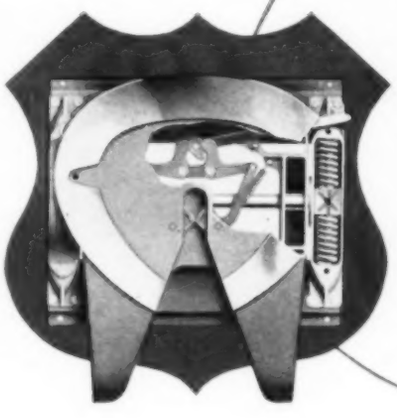
Moving Mountains of Victory Freight

ON EVERY U. S. HIGHWAY

U.S. 61

America's heroic accomplishments in this war have startled the world. "Moving mountains" has become an everyday fact—and Highway "Clipper" and "Freightmaster" Trailers have done their full share in the all-important job of moving mountains of Victory freight.

Highway commercial trailers are now again in production, with many improvements grown out of Highway's wartime experience. Not the least of these is the new Duolock Lower Fifth Wheel, full rocking, spring cushioned, with safe dual-cam locking, the finest yet developed. Because this mounts on the truck, it can be used with any semi-trailer equipped with a standard S.A.E. kingpin. This improved fifth wheel is standard with all new "Clippers" and "Freightmasters".



Full details about the new improved Highway "Clippers" and "Freightmasters" are shown and described in two new color booklets just off the press. Write for your copies now, and let your next trailers be Highways!

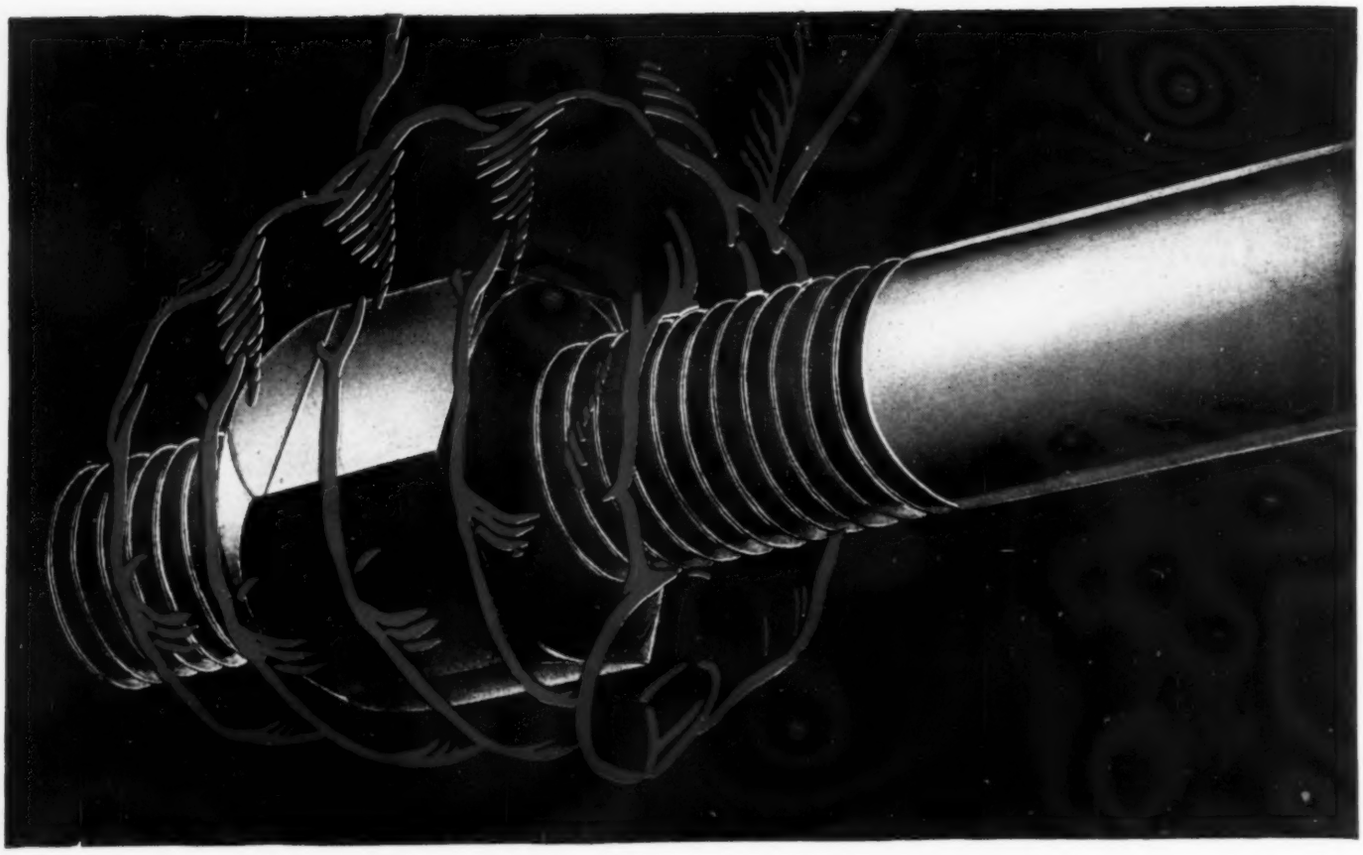
HIGHWAY TRAILER COMPANY

Factory and General Offices, Edgerton, Wisconsin

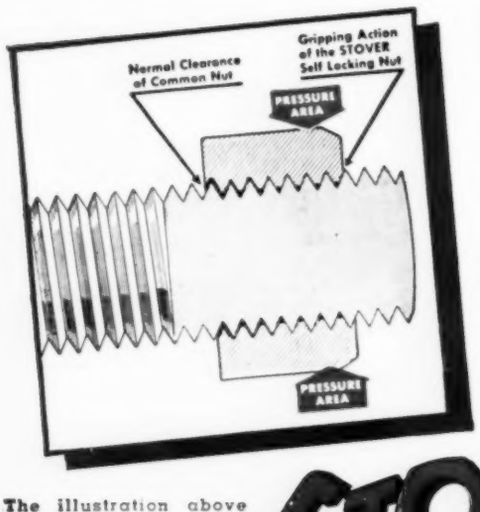
Truck Trailers and Bodies • Earth Boring Machines
Winches and other Public Utility Equipment

ARMY E NAVY

HIGHWAY AMERICA'S QUALITY TRAILERS



IT'S THE VIBRATION-DEFYING GRIP THAT COUNTS



The illustration above shows a cross section of an ordinary bolt on which a STOVER Self-locking Nut has been screwed. Note how the tapered threaded section of the nut grips the bolt, thereby giving it maximum vibration resistance.

THE GRIP of the Stover Self-locking Nut is supplied *by the nut itself.* It is the grip *of metal on metal.* It derives its power from the elasticity of its own metal for it is in one piece with no complicated assembly.

Examination will reveal that the Stover Self-locking Nut is no ordinary nut. Indeed it is a product of exceptional precision. No less than sixteen precision machines are employed in its manufacture and inspection.

Today it is eliminating the loosening effect of vibration on many types of war machines. Tomorrow it will do the same thing for machines of peace. Are you interested?

Send for descriptive literature and samples.

STOVER
SELF-LOCKING NUT
"IT WON'T SHAKE LOOSE"

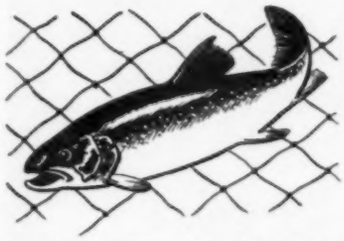
- meets Army and Navy Specifications
- does the whole job by itself
- locks at any point desired on the bolt
- does no harm to bolt threads
- can be used over and over without substantial loss of efficiency
- made in standard sizes and threads from ¼ inch to 1 inch
- costs no more than older-type less efficient lock nuts

STOVER LOCK NUT
AND MACHINERY CORPORATION

Easton, Penna., Bushkill Drive • New York 17, N. Y., 101 Park Avenue
Detroit 2, Mich., General Motors Building
REPRESENTATIVES IN PRINCIPAL CITIES

Please mention FLEET OWNER *when writing to advertisers.*

In the "mining" of petroleum, as in the mining of many other ores and the production of aggregates, Cummins Dependable Diesels play a vital role. They power drilling rigs, trucks, shovels, dredges and many other types of equipment . . . have established an enviable record for reliable, low-cost performance on the toughest 24-hour-a-day jobs.



America's commercial fishing boats are bringing in record catches to meet record war-time requirements for fish and fish by-products. Many of these boats are Cummins Diesel-powered because fishermen everywhere know that the best assurance of being "first out and first back" is a Cummins Marine Diesel.

Basic in war and basic in peace is the vast logging industry of the Northwest. Here, the performance of Cummins Dependable Diesels in yarders, loaders, trucks and tugs explains why Cummins Diesel power is known among loggers as "the power behind CHEAP LOGS."

In agriculture and its many allied industries, Cummins Diesel power has innumerable applications. It is widely used in the West for irrigation purposes . . . in cotton gins, flour and feed mills, ice plants, dairies and many other places where its economy and dependability have been instrumental in increasing production and also decreasing costs.

Automotive models • marine engines for propulsion and auxiliary power • power units of all types • stationary engines • generating sets • locomotive models.

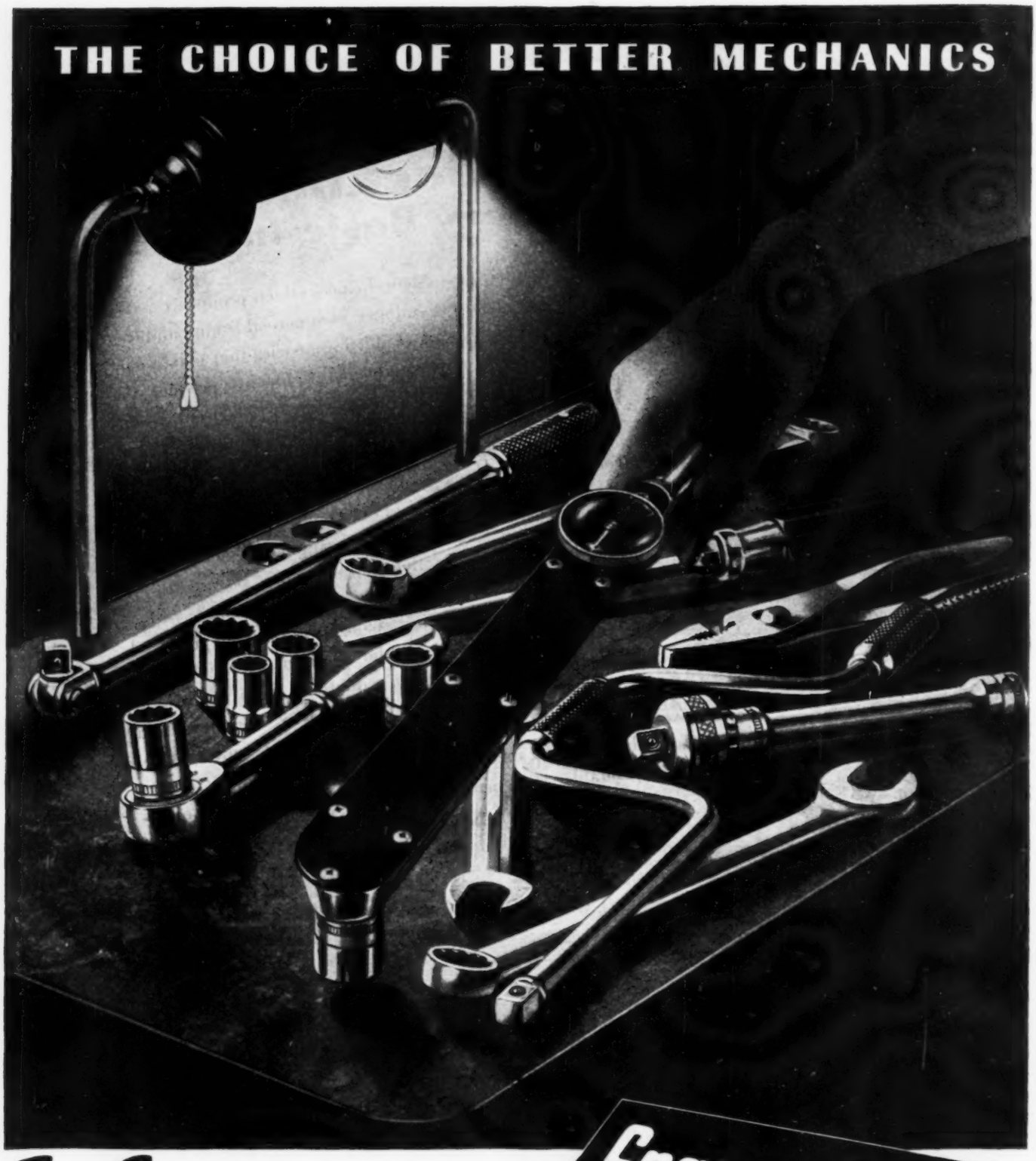
Backbone of every Basic Industry

In the "mother" or basic industries which produce the raw materials—agriculture, mining, commercial fishing and logging—and in the countless allied industries that play a part in the conversion of raw material into finished product, the development of the high speed diesel in 1932 went a long way toward changing modern concepts of power.

This diesel was a Cummins Diesel. Once and for all it struck away the shackles of excessive weight and size which had so long limited the use of diesel power. Once and for all it proved that diesel power could be applied to virtually any heavy-duty job and do that job—cheaper, faster, longer.

Since 1932, continued refinements in every phase of design, construction and material specification have produced still further improvements in the Cummins Diesel's operating economy . . . still further reductions in its weight and dimensions per horsepower. That's why operators and builders of all types of powered equipment—automotive, industrial and marine—have turned to Cummins for the dependable, low-cost power which is the backbone of industry. CUMMINS ENGINE COMPANY, INC., Columbus, Ind.

THE CHOICE OF BETTER MECHANICS



Snap-on Tools
THE CHOICE OF BETTER MECHANICS

For Every **nut turning operation there is a Snap-on wrench *engineered* to do the job better, easier, with greater accuracy and safety. Standout for precision is the Snap-on Torqometer shown above . . . unexcelled among tension measuring wrenches for unfailing accuracy under all conditions.**

Widely used in factory assembly for precise bolt tensioning to prevent mechanical distortion, a Snap-on Torqometer insures prescribed bolt tensions on your important service operations . . . helps assure peak performance of every service job.

The TQ-150, standard 150 ft. lb. Torqometer accepts any ½" square drive socket and can be used with extensions or ratchet adaptors. As you tighten the bolt you watch the bolt tension increase . . . on the easily read dial . . . and stop at the exact tension required. Fourteen other sizes ranging from 0-30 in. lbs., up to 0-2000 ft. lbs., are also available. Write for Snap-on's car and truck tension chart.

SNAP-ON TOOLS CORPORATION, 8066-L 28th Ave., Kenosha, Wis.

THE LAMP THAT DOES NOT GROW DIM!

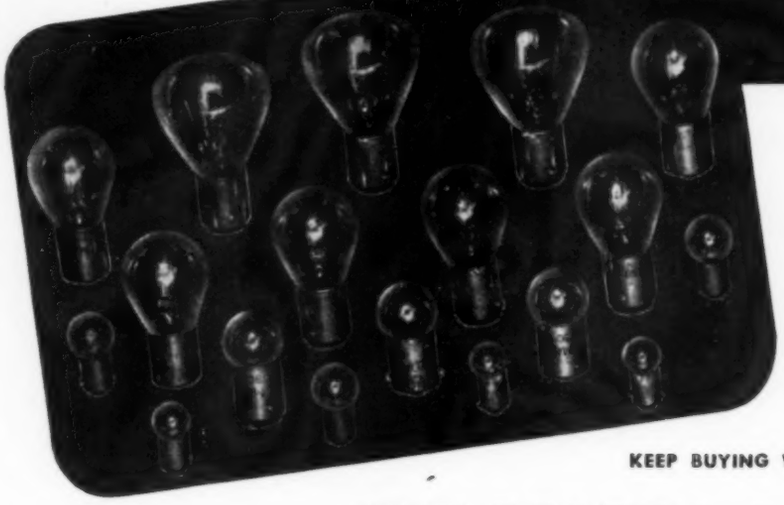
FOR SAFER WINTER DRIVING

HERE'S *real* value in headlighting—headlamps that do not grow dim! Tests show that at the end of life, the average General Electric Sealed Beam Headlamp delivers 99 per cent as much light as at the beginning.

The hard glass lens and reflector are fused together to form a one piece hermetically sealed unit. Dirt, dust and air *never* can penetrate the hermetically sealed G-E Mazda Sealed Beam lamp. The reflector can't tarnish.

Give your drivers safer lighting with steady, maintained light output from G-E Mazda Sealed Beam Lamps. Get a supply today.

THE WHOLE THING IS A BULB!



CHECK YOUR STOCKS OF OTHER TYPES OF G-E AUTO LAMPS

Be sure you have adequate supplies of G-E "protection lighting" bulbs — marker, parking, stop and tail, and direction signal lamps. Order them when you place your order for G-E Mazda Sealed Beam Headlamps.

KEEP BUYING WAR BONDS—KEEP THE WAR BONDS YOU BUY

G-E MAZDA LAMPS

GENERAL ELECTRIC

Hear the General Electric radio programs: "The G-E All-Girl Orchestra", Sunday 10 p. m. EWT, NBC; "The World Today" news, every weekday 6:45 p. m. EWT, CBS.

By Rotor Swift

WHAT DOES the LAW SAY?

THERE are many legal principles which no fleet owner can afford to ignore, and these rules *can* be explained in simple language, without resorting to the jargon of the courts. . . . This department will undertake to explain such general points of law, without using any legal terminology. . . . Each one is based upon an actual American court decision but all names are fictitious.—Ed.

"Free Passage to the Left"

AN American truck driver was lawfully travelling on a road in the Canadian Province of Saskatchewan, and on the right hand side of the road. There was about four or five feet of travelled highway on his right, but ample room to pass on his left. . . . . A Saskatchewan truck overtook the American truck, the driver blew his horn, the American driver did not pull to his right, the Canadian passed on his left, and collided with the American truck.

"I want a new truck," the Canadian driver announced. "You violated the Sasketchewan law that says that 'the person overtaken should as soon as possible turn to the right so as to allow free passage to the left.'"

"I'm a stranger in a strange land," the American driver admitted. "I don't know your Saskatchewan laws, but I'll hazard a guess that the law you quoted means that as long as there was 'free passage' on my left, I didn't have to pull to my right, even though there was some additional space on that side. I've heard Canadian justice highly spoken of on my side of the line, and, if you want to go to law, I'll just bet you $100 that the Canadian judge says I am right."

"You're bet's covered," the Canadian countered. . . . And the parties went to court. . . . "The overtaken driver is required as soon as possible to 'turn to the right so as to allow free passage to the left'; that (free passage) means sufficient space for any overtaking vehicle to pass safely, and when there is already such sufficient space, there is no duty on the overtaken driver to turn to the right," the Canadian judge said. . . . And the American driver won the suit, and his bet.

•

Equal "Rights" on the Highway

THE American Courts have agreed that the rights of all persons lawfully using the highway are mutual and equal, so that one pedestrian, horse, truck or motorcycle has no superiority over any other person, horse, or motorcycle using the same highway.

Consider, however, the case of the Arkansas truck driver who collided with a mule hitched to a buggy and driven by a bewhiskered citizen of that state. . . . "All citizens have equal rights on the highway, and you're in the wrong," the mule driver maintained, as he picked himself out of the ditch and appraised his damages. . . . "That's half right," the truck driver agreed. "You have equal rights with every other mule driver in the state, and I have equal rights with every other truck driver; but when you tangle with a truck, your old mule is in the inferior position."

"Driving a mule to a buggy is a like and proper means of conveyance," said the Court. "Certainly a citizen is not to be deprived of his right to use any means of conveyance within his control because forsooth, the animal he must drive is unaccustomed to the sight of automobiles and becomes frightened upon meeting or coming near them. Public highways are established for the benefit of all who find it necessary or desirable to travel thereon, adopting any means of conveyance not prohibited by law," said the Arkansas Supreme Court, in deciding in favor of the mule driver.

•

The "Doubtful" Warning

"THE driver of any motor vehicle approaching a horse, domestic animal or horse-drawn vehicle shall stop on request by signal of the person driving or in charge of such animal," a Kansas statute enacted.

A Kansas truck driver, approached a team of Kansas mules, heard the mule driver say "Look out!" did not stop, the mules ran away, and the mule owner sued the truck driver.

"I gave you ample warning," the mule owner contended. . . . "But you didn't warn me to stop," the truck driver maintained.

"The words, 'Look out!' might mean turn out, slow down speed, muffle the noise, or pass as far to the other side of the road as possible. . . . In some cases the driver of a nervous horse might prefer that the operator of the automobile would increase his speed and hurry on. . . . He might conclude that there was less danger to pass on than to stop, and if he concludes to exercise the option and control which the statute gives him to arrest the approach of the automobile, he should make his meaning plain enough for comprehension by the ordinary chauffeur," said the Kansas Courts in deciding that the truck driver was right.

•

Checker is "Safety" Worker

BILL JONES worked for the Windy City Freight Lines as a checker and put in several hours of overtime, during which time his main duties concerned the direction and supervision of loaders and helpers, whose activities consistently have been found by the courts to affect safety of operation of motor vehicles.

In denying Jones recovery of overtime compensation recently, under the Fair Labor Standards Act, the Illinois Appellate Court declared that Bill, as a checker, was particularly responsible for "safety of operation" by virtue of his supervisory capacity, and that, therefore, his maximum hours of service are subject to regulation by ICC, under the provisions of the Interstate Commerce Act.

INSTALL...

MoPar

FACTORY-ENGINEERED AND INSPECTED

Pistons

Of superior quality in every detail of material, construction, and precision workmanship. Finished Pistons available in sets or individual units. Always use MoPar Pistons for replacement in Plymouth, Dodge, DeSoto, or Chrysler engines. And for a perfect combination, use MoPar Piston Rings, MoPar Piston Pins, and Piston Pin Lock Rings.

ALUMINUM ALLOY PISTONS

MoPar Aluminum Alloy Pistons are *now* available. Finished Pistons in all standard sizes and the following oversizes: .005", .020", .030", .040", .060"; Semi-finished Pistons, standard to .023" oversize, and .025" to .050" oversize.

CAST IRON PISTONS

For engines equipped with Cast Iron Pistons, MoPar Cast Iron Pistons are available in all standard sizes and standard oversizes.

•

NOTE TO ALL REPAIR SHOPS

If you need parts of any kind for a Plymouth, Dodge, DeSoto, or Chrysler car, see a dealer for these cars. For Dodge Truck parts, see a Dodge dealer.

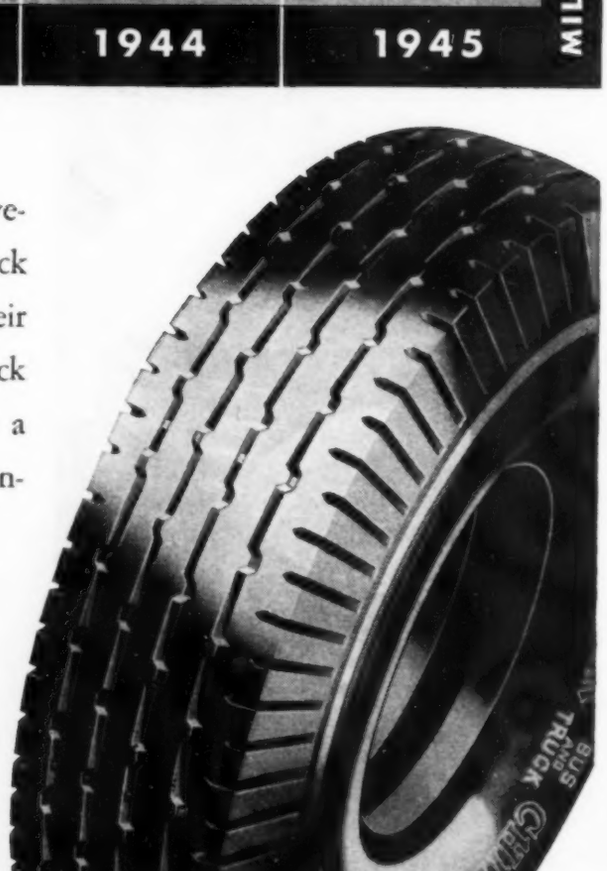
REPLACE PARTS ONLY WHEN NECESSARY—CONSERVE FOR VICTORY

CHRYSLER CORPORATION
PARTS DIVISION
MoPar
TRADE MARK
PARTS AND ACCESSORIES
FACTORY ENGINEERED AND INSPECTED

The Trade Mark "MoPar" Identifies Products Supplied by Chrysler Corporation — Parts Division

CHRYSLER CORPORATION—PARTS DIVISION, DETROIT 31, MICHIGAN

SINCE the early days of the war, real improvement has been made in recapping materials. Truck and bus owners now report mileage beyond their expectations with tires treaded with Mohawk Truck Tire Material. When it is properly applied to a sturdy Mohawk carcass, you will have made a splendid investment in tire service.



MOHAWK TIRES

and Recapping Materials are both GOOD

THE MOHAWK RUBBER CO., AKRON, OHIO

HOW MANY TIMES HAVE YOUR TRUCKS DRIVEN AROUND THE WORLD?

The mileage on your trucks is enormous. And they've still got a long way to go, till new trucks are easy to get. But you can keep your motors at peak efficiency by replacing worn parts with genuine McQuay-Norris parts . . . Altinized Engineered Set Piston Rings and other parts from the complete McQuay-Norris line . . . parts engineered specifically for each make and model of truck.

McQUAY-NORRIS
ALTINIZED
Engineered Set
PISTON RINGS

McQUAY-NORRIS

PISTON RINGS • PISTONS • PINS • VALVES
BOLTS • BUSHINGS • SILENT-U SHACKLES

TIME TESTED
McQUAY NORRIS
AUTO PARTS
PROVEN IN SERVICE

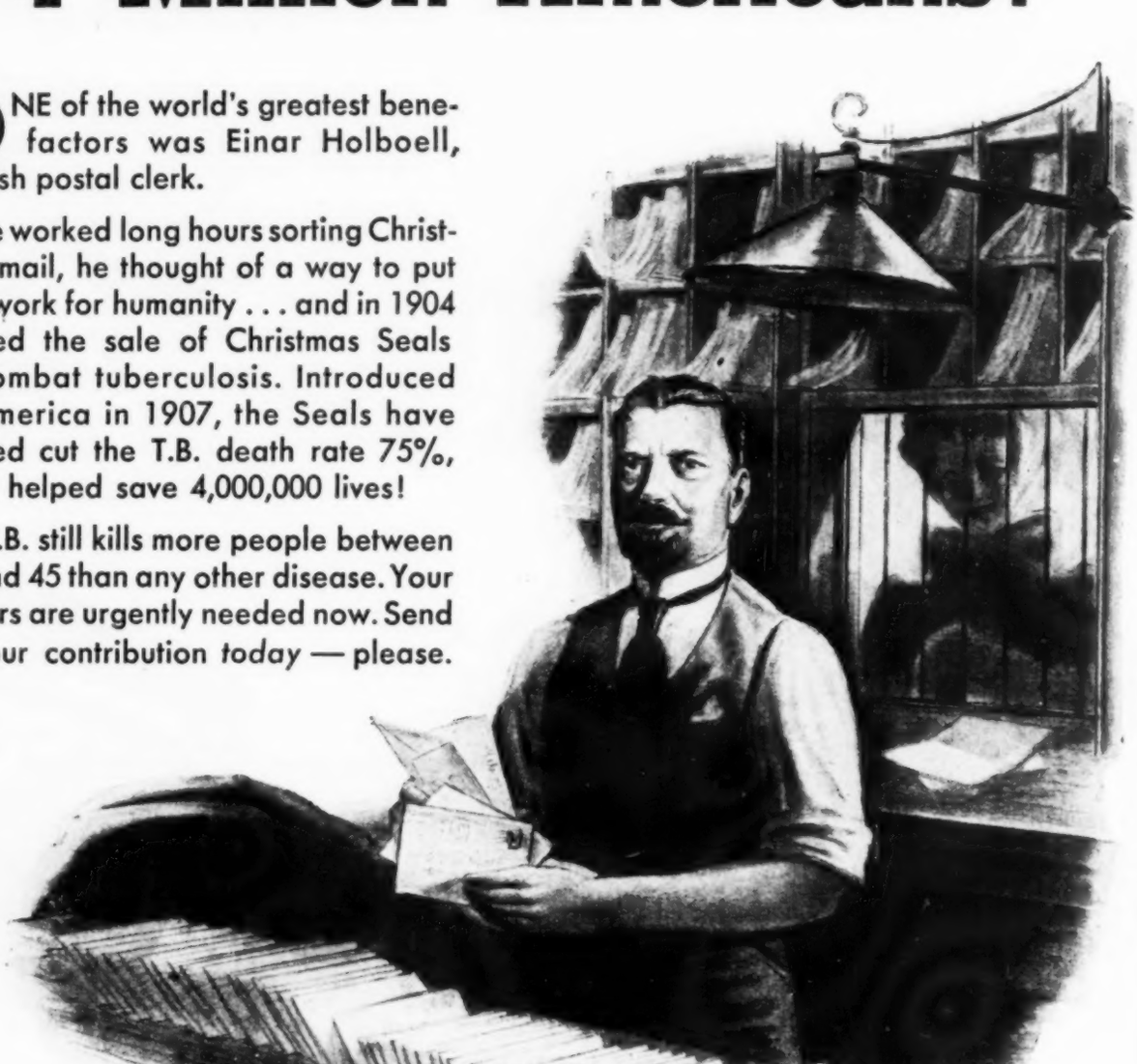
BEARINGS • SLEEVES • PUMP PARTS
WHEEL SUSPENSION PARTS

How a Dane Saved 4 Million Americans!

ONE of the world's greatest benefactors was Einar Holboell, Danish postal clerk.

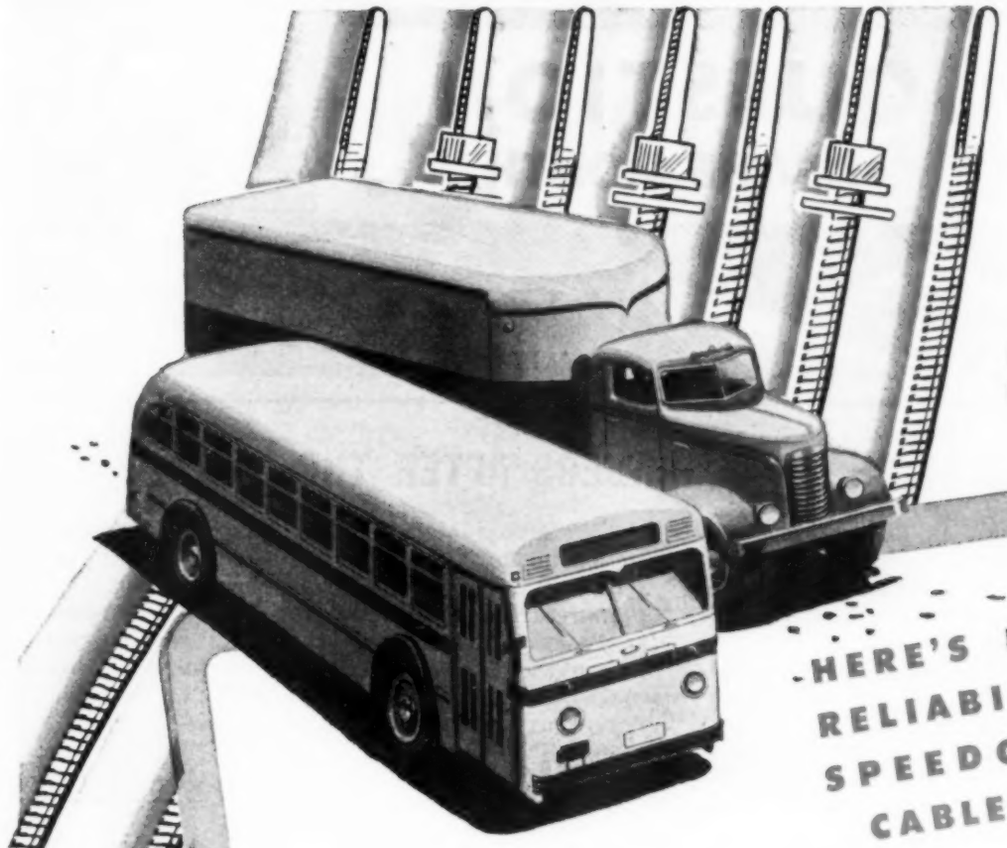
As he worked long hours sorting Christmas mail, he thought of a way to put it to work for humanity . . . and in 1904 started the sale of Christmas Seals to combat tuberculosis. Introduced in America in 1907, the Seals have helped cut the T.B. death rate 75%, have helped save 4,000,000 lives!

But T.B. still kills more people between 15 and 45 than any other disease. Your dollars are urgently needed now. Send in your contribution *today* — please.



BUY CHRISTMAS SEALS!

The National, State and Local Tuberculosis Associations in the United States



HERE WE GO TO TOKYO—
BUY ANOTHER WAR BOND!

HERE'S UTMOST RELIABILITY IN SPEEDOMETER CABLES, TOO

No matter what makes of buses or trucks you operate, there are AC-engineered and AC-built Speedometer Cables for replacement service, either in complete cables ready for use, or in special kits with necessary parts and tools.

Twenty years of "know-how"—twenty years of experience in meeting the factory equipment requirements of automotive engineers—have given AC Speedometer Cables the *utmost reliability*. That's why more and more fleet owners insist upon AC Cables for all replacements.

Standardize on AC, the equipment that gives you *utmost reliability*.

AC CABLES assure THIS kind of QUALITY

- ★ Flexible cables made of highest grade steel wires on special, patented winding machines.
- ★ Flexible cables heat treated by patented methods to assure highest possible quality, which means:
  - Low whip
  - Low internal friction
  - Low torsional flexibility
  - High torque strength
- ★ Built to meet the exacting requirements of car and truck makers.

AC SPEEDOMETER CABLES

DO YOU WANT SHOCK-ABSORBERS AFTER THE WAR?

DO we want shock-absorbers on *all* trucks, come post-war? . . . That's an "absorbing" question, even though there is now no question as to the necessity for "shocks" on passenger-cars and light trucks.

So, here's your chance, boys, to voice your own personal *opinion* on the subject. . . . And also to swap your *past* experiences with shock-absorbers.

This is now the third of our new series of post-war equipment preference surveys, and we need *lots* of replies in order to get representative opinion.

In return for your cooperation, you will receive a *confidential* tabulation of the whole survey—months before the emasculated version is published in this magazine. . . . What say, gentlemen? . . . Your participation, as always, is highly esteemed.—*Editor.*

(Please tear out and mail to The Editor, Fleet Owner, 90 West St., New York 6, N. Y.)

Question No. 151—Shock-Absorbers

Have you had any experience with shock-absorbers on trucks? ☐Yes; ☐No. On buses? ☐Yes; ☐No.

If so, how have *truck* (or bus) shock-absorbers performed? ☐Satisfactory; ☐Unsatisfactory.

If unsatisfactory, please explain and refer to type or make:.....

.....

If satisfactory, what advantages have you obtained from truck-type shock-absorbers? (*Please check below*)

☐Better all-around ride.
☐Less spring breakage.
☐Less chassis, body damage.
☐Less damage to loads.

Other advantages? (Please explain).....
.....
.....
.....

Do shock-absorbers require much in the way of lubrication and maintenance? ☐Little; ☐Much.

What maintenance difficulties do you have with shock-absorbers in general? (*Please check below*)

☐Lose fluid too quickly.
☐Arms or links wear fast.
☐Arms or links break.
☐Fail to operate properly.
☐Become loose on frame.
☐Need too much adjustment.

Others? .....
.....
.....

How often do you check your shock-absorbers?..... How often do they need refilling?.....

Do you think post-war *trucks* should be equipped with shock-absorbers? ☐Light trucks only; ☐All trucks.

If light trucks only, up to what tonnage-capacity trucks should have them?.....*Tons (Inclusive)*

Should shock-absorbers be used on front *and* rear of such trucks? ☐Front and rear; ☐Front only.

What *type* of shock-absorber would you prefer? ☐Hydraulic; ☐Pneumatic; Other type? .....

Which type of *mounting* would you prefer? ☐Lever-type; ☐Straight-through type; Others? .....

What *make* of shock-absorber do you prefer?..... What *make* of fluid?.....*(Confidential)*

REMARKS: (*"Griping" is in order here, too*).....
.....
.....

How many vehicles in your fleet? (*Please indicate below*)

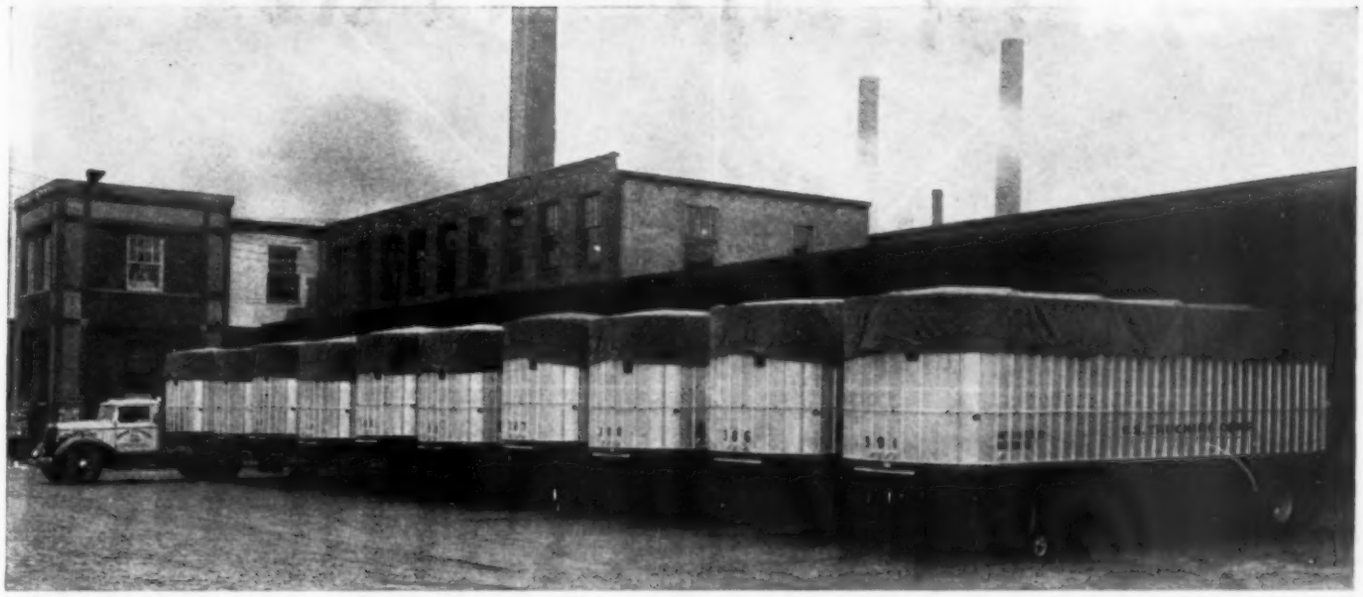
Trucks..... Tractors..... Trailers..... Pass. Cars..... Buses..... Miscellaneous.....

Mail THIS COUPON FOR FREE SURVEY

Name of Firm.....
Address .....
City and State.....
Your Name .....*Position*.....

U. S. Trucking Corporation advises:

ONE tractor keeps 4 to 5 trailers in use



● **Here is one of the thousands of home-front trailer transport jobs . . . and one of the many U. S. Trucking freight transfer operations by trailer . . . that move goods with *flexible* efficiency!**

FROM terminals in New York City and adjacent territory, U. S. Trucking Corporation, carloading companies and other carriers transfer to local piers and other terminals general merchandise for consolidated cars forwarded via rail facilities.

Freight must be handled swiftly, flexibly, economically from congested piers and terminals. A fleet of U. S. Trucking trailers helps fill the bill!

One tractor keeps 4 to 5 trailers in use—being loaded, transferred or unloaded. From one pier or terminal it rushes each freshly loaded trailer to another terminal or pier for railroad carloading, picks up a freshly emptied trailer and returns it for reloading—then repeats this process.

This tractor-trailer transfer thus involves the operating cost of only *one motor, one driver*—as compared with 4 to 5 motors and drivers required otherwise.

Lapeer type Trailmobiles, with automatic coupling and uncoupling, help to speed the operation. In the metropolitan New York area, U. S. Trucking Corporation keeps about 140 trailers busy, of which around 100 are Trailmobiles.

Use Service Centers...and keep your present equipment rolling. Use Trailmobile Service Centers—52 of them, strategically located. Send for list.

The Trailmobile Company

Cincinnati 9, Ohio — Berkeley 2, California

NEW TRAILMOBILES AVAILABLE!

Pictured here is the headquarters plant of The Trailmobile Company—the spacious, streamlined factory where under ideal working conditions, an army of highly-skilled technicians and mechanics produce an endless stream of trailers.

As in the first World War, The Trailmobile Company has been honored in this second war with the "E" for excellence flag. Now, Government allocations permit the manufacture of Trailmobiles for commercial use. See your Trailmobile distributor for new Trailmobiles!

TRAILMOBILE

Commercial Trailers for War and Peace
The Vital Link in Flexible Transportation

May the Peace of the First Christmas soon abide with us all

KING BEE

AMERICAN AUTOMATIC DEVICES CO.

Manufacturers of the Famous KING BEE *Products*

HARRISON, THROOP AND CONGRESS STREETS . . CHICAGO, ILL.

This sleek, new, Heil "trailerized" L.P.G. transport carries a 4000-gallon payload of liquefied petroleum gases.

New HEIL "Trailerized"* L.P.G. Carrier Speeds Liquefied Gas Transport . . .

Safely—Economically

New low center of gravity reduces side sway on curves—saves wear on tires—permits easier pulling — increases your earnings on liquefied gas transportation

Designed and developed by The Heil Co., this liquefied petroleum gas "Trailerized" tank is suspended between axles to give you the important safety factor of low center of gravity. Soundly engineered fabrication of the tank includes processes whereby it is X-rayed and stress relieved. Every inch of the weld is examined and tested to assure maximum strength and minimum stress. These processes permit the use of a lighter gauge, *high-tensile* steel which add up to greater total gallonage for you.

You will find it one of the safest, most compact carriers on the highway — it pulls easily — it has less side sway — and less wear and tear on the tires. Use it to carry Butane, Propane, and other liquefied petroleum gases. Available in working pressures from 80 to 250 pounds per square inch, for most types and combinations of liquefied gases.

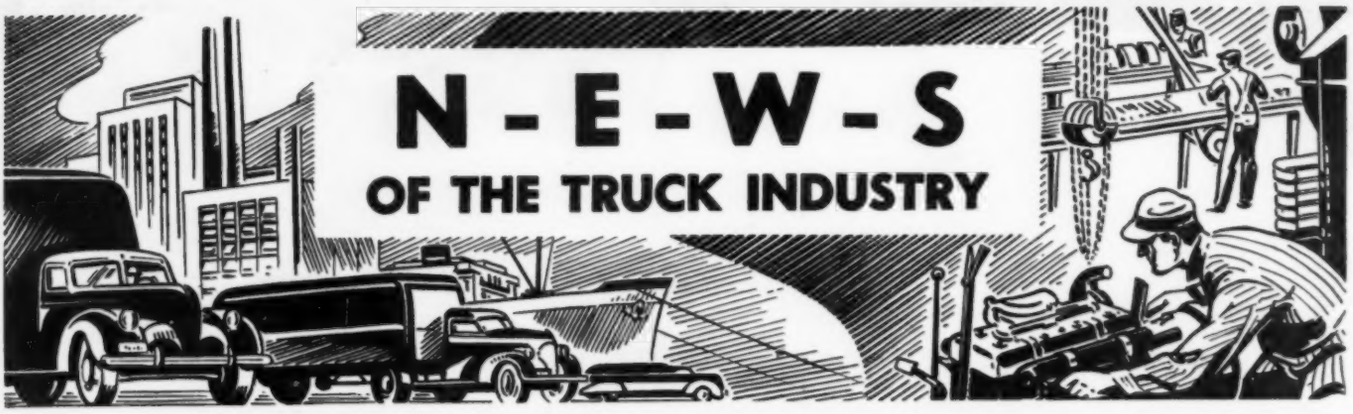
If you have a liquid gas transport problem, consult with Heil engineers. Your inquiries will receive prompt attention.

T-105

ARMY E NAVY

THE HEIL CO

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN



N-E-W-S
OF THE TRUCK INDUSTRY

Carriers Make Bid for Two-Way Radio

MOTOR freight carrier representatives made a strong bid for allocation of short-wave, two-way radio bands to the trucking industry, in hearings recently held by the Federal Communications Commission. . . . Witnesses testified for the industry as a whole, and for its major branches, as the Commission continued lengthy proceedings looking toward allocation of wave-lengths to all types of industry.

●

IHC Sets Up Separate Truck Branches

SEPARATE motor truck branches have been set up by International Harvester at several points where the company formerly operated combination truck, farm equipment and industrial power branches. . . . Such recently-established truck branches include Denver, Indianapolis, Atlanta and Kansas City. . . . The most recent of such changes is the establishment of a separate motor truck branch at Louisville, Ky.

●

Dodge Expands Factory Field Personnel

DODGE Division of Chrysler Corporation announces the expansion of its factory personnel in the field, naming four new regional managers and 15 additional district managers. . . . The new regional managers are: Wilbur T. May, New York; Mark M. Whipple, Boston; Leslie W. Neumann, St. Louis; and J. W. McLaughlin, Cincinnati.

●

Two Added to Portland Branch Staff

FRUEHAUF Trailer Company's Portland (Ore.) branch has recently appointed two new men to its sales and service staff, according to W. J. Jarvis, branch manager. . . . They are Ivar R. Madsen and Merle B. Shannon. . . . They will handle sales and service on all types of Fruehauf trailers.

●

Federal Gets Another "E" Star

THREE times a winner in two years of the Army-Navy "E" award for meritorious service in the production of heavy-duty army trucks, officials and labor representatives of the Federal Motor Truck Company recently gathered atop the roof of the company's main building in Detroit, to inspect the new two-star honor flag, as it was officially awarded and unfurled.

Wants Rail Rates Raised, Lowered, Etc.

RAIL passenger fares should not be lowered, lest such action encourage non-essential travel, ODT recently told ICC. . . . At the same time, OPA advocated a reduction in passenger fares and opposed reinstatement of freight rate increases, which have been under suspension since May, 1943. . . . ATA officials told ICC that while the railroads should have an increase in all rates, they are particularly in need of a very large increase in l. c. l. rates. . . . The motor carriers contend that the rails are conducting l. c. l. operations at a loss, to prevent diversion of such traffic to highways.

●

THIS Federal C-2 wrecker received special mention in a news release from fighting fronts, for excellent service in helping to salvage damaged Flying Fortresses at air bases in England—and elsewhere, too.

●

Builds 150,000th Army Truck

STUDEBAKER recently made formal delivery of its 150,000th multiple-drive, heavy-duty military truck to the armed forces. . . . At the same time, the corporation also delivered its 50,000th Wright Cyclone engine. . . . As this volume production of war goods passed two round-figured milestones, two branches of the military commended company officials and plant workers.

●

Promises More Tires Next Year

ASSURANCE of an increased supply of tires for cars and trucks in 1945 was made by a field representative of Seiberling Tire Company recently. . . . In 1945 there will be 4,800,000 more truck tires manufactured by the tire industry than in 1944, and enough passenger-car tires manufactured to insure one new tire each for the 22,000,000 cars estimated to be on the highways, he said.

Rationing of Used Cars May Come

RATIONING of used cars before the war's end may be in the cards, in the opinion of David G. Kelly, President of the National Automobile Dealers Association. . . . Said Mr. Kelly in a Los Angeles interview: "The odds are at least 60-40 that rationing of used automobiles will be necessary before the end of the war. . . . Our margin of safety in available automobiles and equipment, excluding trucks, has now dropped to only 10 percent, and it is still dropping."

●

Ford to Build Denver Parts Depot

THE Ford Motor Company will construct a $500,000 parts depot in Denver, Colo., which will supply parts for 63 counties in Colorado, 30 in New Mexico, 18 in Wyoming, 14 in Nebraska and 1 in Texas. . . . It will serve dealers in these states, who are now dependent upon Kansas City for their parts.

●

Mack Resumes Bus Production

A NEW Mack bus, scheduled for delivery in mid-1945, will shortly get under way, it is announced by Mack Manufacturing Corporation. . . . It is designated as Model C-41 and seats 41 passengers, succeeding the Model CM which Mack turned out before the war. . . . Features are a larger power-plant, a hydraulic torque-converter, a new heating and ventilating system and better springs, brakes and styling.

●

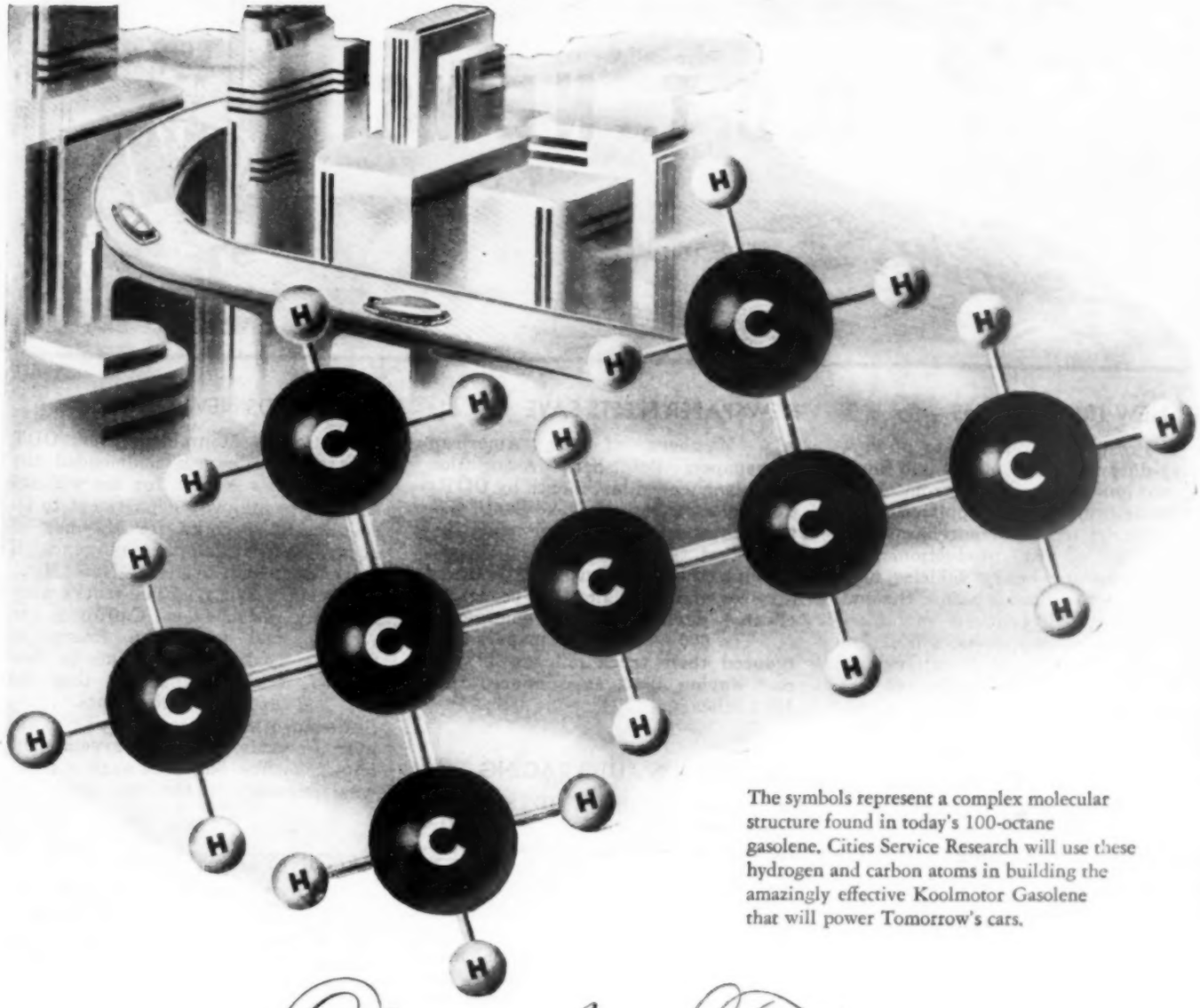
Road Accidents Increase in Britain

ROAD accidents in Great Britain during August resulted in 501 deaths and 10,663 injuries. . . . The figures compared with 404 and 9,507, respectively, for August, 1943.

●

Preparation for Winter in Order

WITH fewer automobiles on the highways to provide essential transportation through the winter, state highway officials are warning operators to prepare for approaching hardships of snow and ice over a large section of the Nation. . . . Highway crews in many states are busy with last-minute preparations for cold weather road maintenance, and county and municipal officials are being urged to check equipment used in snow-clearance work.



The symbols represent a complex molecular structure found in today's 100-octane gasolene. Cities Service Research will use these hydrogen and carbon atoms in building the amazingly effective Koolmotor Gasolene that will power Tomorrow's cars.

Design for Tomorrow

PETROLEUM—Bloodstream of War—will be a vital Bloodstream of Peace. In the Cities Service Research Laboratories, work has been done on many new products, new processes, new devices. Some are "hush-hush". Others are ready and waiting for developments in the automotive and other industries—developments which can come only *after* Victory is won.

Cities Service stands ready *now* to "service" your car of the future. Sounds incredible? Then let us prove it.

Before new models even reach the blueprint stage, our research people are in consultation with the automobile manufacturers, checking on the fuels and lubricants they will need. And so flexible are the ultra-modern facilities of the great new Tutwiler Refinery at Lake Charles, Louisiana, that we are ready at a moment's notice to meet the exacting demands of tomorrow's engines.

And so out of research, our specialists have been able to develop high-powered, high-octane gasolene — temperature-resisting lubricants — waterless soap, fuel-saving devices, new plastics and countless petroleum derivatives.

One thing is sure . . . you can look to Cities Service for important new developments after the war.

Progress through Service—

O.D.T. NEWS

RE: NEW TRUCKS IN '45

● Prospective purchasers of new heavy-duty trucks in makes and models no longer available from 1944 production, may make application to ODT district offices to purchase such vehicles out of 1945 production. . . . Applications for heavy vehicles now in stock, or to be made before the end of the year, will continue to be accepted, but those approved will expire December 31st. . . . Expiration date of any of the applications for vehicles in the makes and models now exhausted, but which will come from 1945 production, will be three months after date of approval.

●

ODT FREES TWO MORE

● Last month ODT announced the relief from government possession of two more motor carrier transport lines which were taken over by the government on August 11th, following a labor disturbance. . . . They are: Chief Freight Lines Company, Kansas City, Mo., and Riss & Company, Inc., of the same city. . . . This brings to a total of 10 the number of firms thus far released, out of the 103 which were originally "frozen" under government control last Summer.

●

MUST REPORT TIRE NEEDS

● If any of your vehicles are out of service due to lack of tires, you are now required to submit a weekly report of such vehicles to your local ODT district office. . . . Such reports must be mailed on Thursday of each week, to reach ODT on Friday. . . . Or you can telephone them in to your local ODT maintenance specialist. . . . That's perhaps an ODT "must" that you will *enjoy* doing; they offer to help you.

●

HOWARD NOW RATES HEAD

● ODT last month announced the resignation of John C. Howard as director of its division of rates, and the appointment of Harry Wilson, assistant division director, as his successor.

NEWSPAPER FLEETS SAVE

● Members of the American Newspaper Publishers Association were commended last month by ODT's Col. Johnson for the "excellent" motor transportation conservation results that the industry has achieved through the curtailment of delivery services and through other economies effected during the war emergency. . . . The 600 member newspapers have reduced their truck mileage 43 percent during 1943, as compared with 1941 mileage.

●

ODT PERMITS AUTO RACING

● Last month the ODT partially suspended provisions of General Order No. 14, which has prohibited automobile racing since July 31, 1942. . . . The suspension order applies only to motor vehicles using fuel or tires that are not subject to Federal allocation or rationing, such as industrial alcohols, petroleum derivatives, etc., and special small size tires in racing-car sizes. . . . Somewhat strange is this ruling which denies the use of non-rationed fuels to *average* car users, but permits their use by racing fans. . . . Besides, we were always under the impression that alcohols and petroleum solvents were not exactly abundant (if not critically short) in supply.

●

MORE BUSES FOR CHICAGO

● ODT recently notified Chicago Surface Lines that it would approve orders for the manufacture of sufficient buses to restore service on several routes in that city. . . . Service was suspended on the routes in question in January 1943, and 67 buses then in service were transferred to other routes of the company for service to war plants in outlying sections.

●

CANAL TRAFFIC DOWN

● Because of reduced traffic offerings during the war period, according to ODT, 1944 traffic tonnage on the New York State Barge Canal, exclusive of petroleum and petroleum products moving by steel tank barges, has fallen below that of 1940.

COMMENDS NEW MEXICO

● Col. J. Monroe Johnson, ODT director, last month commended the State of New Mexico for the willingness of its highway department to issue special permits for the use of heavy tank trucks in an emergency oil movement from Artesia, New Mex., to Phoenix, Ariz. . . . The trucks were formerly used from California to Arizona and when the emergency movement called for their use in New Mexico, it was found that they did not meet state requirements. . . . Since no other equipment was available, New Mexico issued special permits. . . . Too bad that such a thing was necessary in the first place!

●

APPOINTS LAMBERTON

● ODT recently announced the appointment of Richard H. Lamberton as deputy assistant director of its Liquid Transport Department, succeeding Porter L. Howard, who has returned to private industry, but will continue to act as consultant to ODT. . . . Mr. Lamberton was previously with the Union Tank Car Company of Chicago.

●

CONVENTION BAN CONTIUES

● Last month ODT announced the continuance of its convention-curtailment program through the first quarter of 1945. . . . At the same time it listed 20 more organizations which have recently cancelled meetings or conventions, in cooperation with the Government's campaign for curtailment of non-war-connected travel.

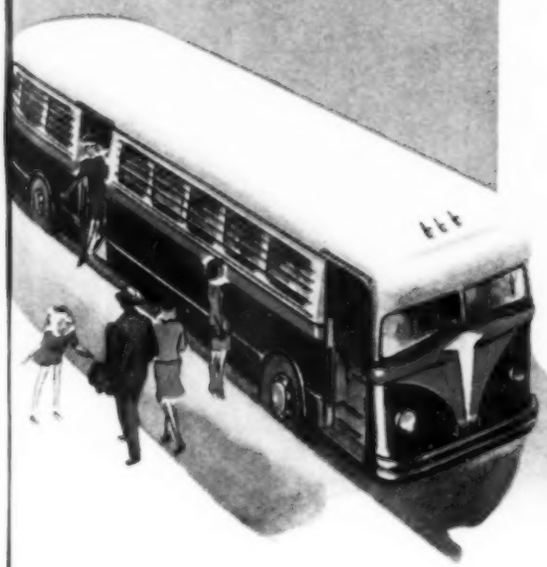
●

ODT APPOINTMENTS

● ODT recently announced that Col. Leo M. Nicolson, division director in charge of storage, is returning to private business and that he is now succeeded by Samuel G. Spear, associate division director. . . . It was also announced that J. R. Shoemaker, associate division director in charge of refrigerated warehousing, is giving up his full-time association with ODT, but will continue to serve as a consultant on refrigeration problems.

A new kind of performance for TRUCKS.. TRACTORS.. BUSSES..

wherever the going is REALLY TOUGH



Gulf Dieselube H.D.

Among operators of heavy-duty gasoline and Diesel engines, today's big problem is *how to keep 'em in service* and any product that can help is a welcome one!

We believe Gulf Dieselube is the answer. *Here is why:* ★Gulf Dieselube possesses remarkable lubricating qualities. ★Its detergent action aids in keeping motors clean and rings free. ★It holds carbon and sludge forming materials in suspension, thus preventing harmful deposits in the crankcase and on rings and pistons. ★It is entirely noncorrosive to all types of alloy bearings, including copper lead and cadmium silver. ★It has an unusually high resistance to oxidation. ★It minimizes wear . . . helps eliminate costly repairs and time out for overhaul. ★It is a most modern type of motor oil for severe service and currently is being used with outstanding success under a wide variety of service conditions.

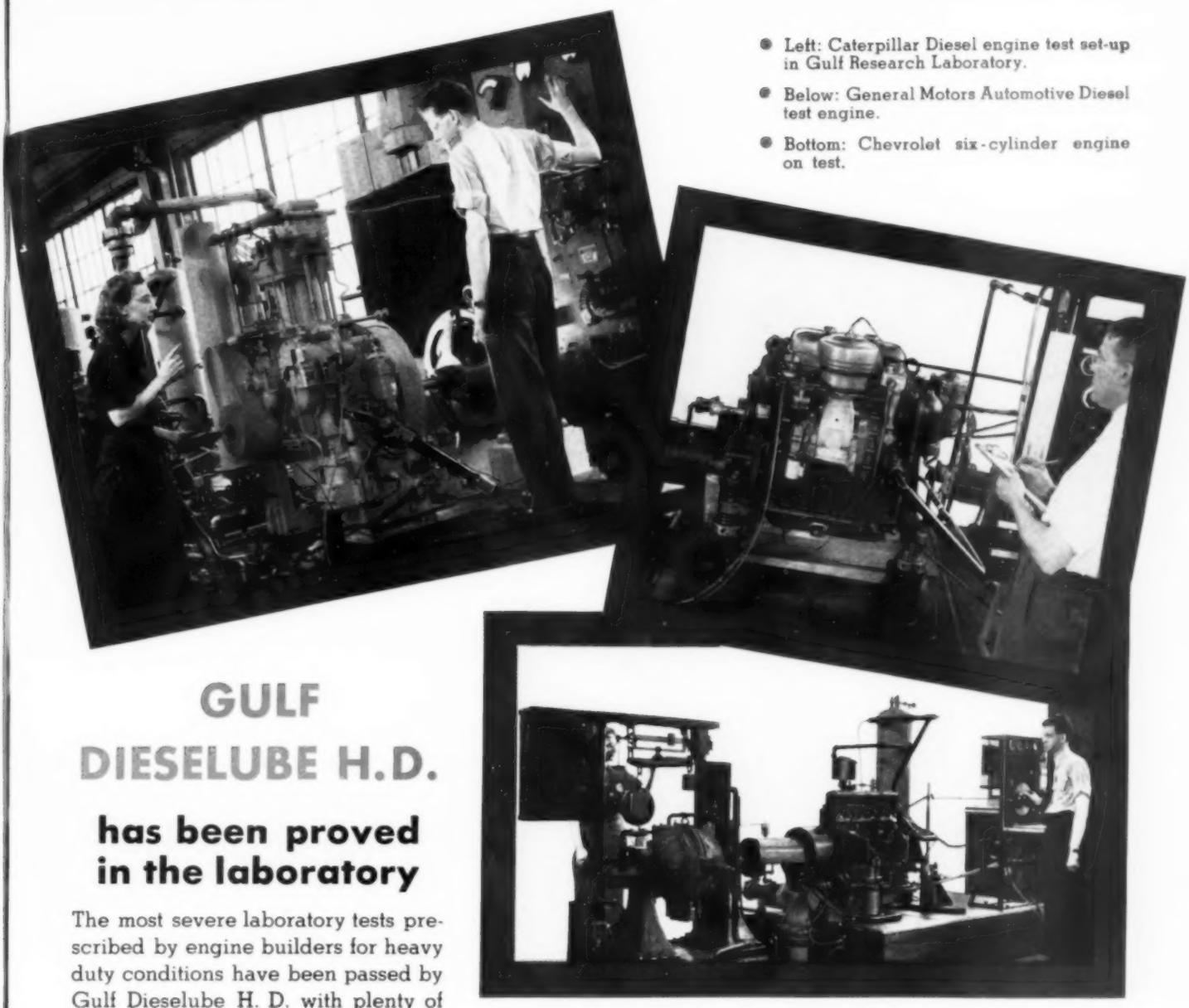
Gulf Dieselube H.D. will help you save money.

Gulf Dieselube H.D.

meets GOVERNMENT SPECIFICATIONS

THE U. S. Army's Specification 2-104B for Engine Oils calls for heavy duty, high quality lubricants which are required by exacting laboratory tests to furnish superior results under heavy duty conditions. Gulf Dieselube H. D. meets this specification for lubricating oil which is mandatory for use by our country's Armed Forces—for tanks, jeeps, trucks and, in fact, for all ground equipment.

Engine manufacturers approve and recommend Gulf Dieselube H. D. for use in equipment which is operated under extreme service conditions and an ever increasing number of Operating Superintendents and others responsible for motor maintenance are specifying Gulf Dieselube H. D. for trucks, busses, tractors, contractors' equipment, road building machinery, and other gasoline and Diesel fueled equipment under their supervision.



- Left: Caterpillar Diesel engine test set-up in Gulf Research Laboratory.
- Below: General Motors Automotive Diesel test engine.
- Bottom: Chevrolet six-cylinder engine on test.

GULF DIESELUBE H.D.

has been proved in the laboratory

The most severe laboratory tests prescribed by engine builders for heavy duty conditions have been passed by Gulf Dieselube H. D. with plenty of quality to spare. Examination of engine parts, after comparative tests, has shown engines lubricated with this product to be in remarkably clean condition.

SEE HOW GULF DIESELUBE STACKS UP ON THESE 7 BIG POINTS

1. Meets U. S. Army Specification 2-104B for Oil; Engine, for use in all ground vehicles operated by the U. S. Army.
2. Approved by manufacturers of Diesel engines for trucks, busses, tractors, marine and stationary installations.
3. Remarkable results secured in preventing ring sticking and clogging of oil lines and in keeping engines clean.
4. Non-Corrosive to alloy bearings—a big factor in today's operation.
5. Minimizes cylinder and ring wear.
6. Non-foaming under any condition of service.
7. Recommended for trucks, busses, tractors, marine engines, industrial Diesel, and heavy-duty gasoline engines.

with GULF Dieselube H.D.

you drain out the dirt before the damage is done

New Improved GULF AUTOMOTIVE GEAR LUBRICANTS ELIMINATE FOAMING

The use of ordinary gear lubricants in units which are overloaded, operated at high speeds, and where parts have become worn frequently results in the formation of foam in transmissions, differentials, and final drives. This condition often presents a serious problem in the loss of lubricant and the resulting lack of adequate lubrication.

The new Gulf Transgear Lubricant E. P. eliminates foaming under all conditions.

This high quality product now contains a new Anti-Foam Agent developed by Gulf lubrication engineers and laboratory technicians and is compounded to provide extreme pressure characteristics of the mild type to protect gears where tooth pressures are high.

Two other Gulf Gear Lubricants—Gulf Hypoid Gear Lubricant 90, A.P.T. (All Purpose Type), and Gulf Transmission Oils (high quality straight mineral gear oils), also contain Gulf's new Anti-Foam Agent and will give entire freedom from gear oil foaming under any service conditions.

A telephone call or a penny post card addressed to the nearest Gulf office listed below will bring a Gulf representative who will demonstrate the non-foaming characteristic of these products and also answer any questions you may wish to ask regarding them.

plus a Specialized Line of Gulflex Automotive Lubricants for Specific Chassis Requirements

1 **GULFLEX CHASSIS LUBRICANTS** are long lasting products, specially manufactured for heavy duty chassis lubrication. Available in two grades to provide proper consistencies for Summer and Winter service, it protects spring shackles and general chassis points from wear under heavy bearing loads. Gulflex Chassis Lubricant S meets U.S. Army Specification 2-107 for Grease, General Purpose, No. 1.

2 **GULFLEX WHEEL BEARING GREASE** was developed in Gulf's Laboratories after exhaustive tests and study of Wheel Bearing Grease requirements under severe heavy service conditions. Specially compounded for exceptionally long service life, this grease will provide safe lubrication for many miles more than might be expected from Wheel Bearing Greases of ordinary quality. Gulflex Wheel Bearing Grease is easy to apply, yet it has a sufficiently high melting point to be retained in the bearing under severe service. Meets U.S. Army Specification 2-108, Grease, General Purpose No. 2 for wheel bearings.

3 **GULFLEX WATERPROOF GREASE** is specially designed for the lubrication of automotive cooling system pumps where a firm water resistant type grease is required. Highly insoluble in hot water or anti-freeze compounds—is also an excellent grease for sealing packing glands as well as for lubricating pump bearings. Meets U. S. Army Specification 2-109 Grease, Water Pump.

4 **GULFLEX UNIVERSAL JOINT LUBRICANT** is a fibrous type grease, prepared to the exacting specifications of manufacturers of grease type universal joints. It properly lubricates grease type universal joints at high speeds and successfully withstands the temperatures developed by overloading and high angle operation.

5 **GULFLEX GRAPHITE SPRING LUBRICANT** is recommended specially for lubrication of metal covered springs where a high quality Graphite Grease is required. It also is recommended for fifth wheel lubrication of tractor equipment.

GULF

GULF OIL CORPORATION · GULF REFINING COMPANY

BOSTON NEW YORK PHILADELPHIA PITTSBURGH ATLANTA
NEW ORLEANS HOUSTON LOUISVILLE TOLEDO

RAYTEX FORTIFIED

DAYTONS Create New WAR-TIME MILEAGE RECORDS

The Fighting Heart of a Dayton Thorobred!

. . . has been battle-proved on the beachheads, and now again over here. It is a mighty combination of new synthetic rubber and stronger, more heat-resistant Raytex Cords. They are welded together into an inseparable union. Thus they distribute and "take-up" road-shocks, impacts, and heat . . . prolonging tire-life. It is tire-engineering of the Dayton Thorobred . . . fortification that assures the delivery of New War-time Mileage Records.

Now everywhere that Daytons roll, reports coming in are the same. "They're giving us mileage we never expected again 'til after the war." These words came from fleet owners themselves, describing this actual experience.

In speeding over terrific mountain highways, with extreme overloads on tight schedule, (and even through the season's hottest spell) "Dayton Thorobreds are creating new mileage records for us, and still have carcasses left that are plenty OK for recapping, and a lot of extra miles." It is mileage today explainable only by the "Heart" in every Dayton Thorobred Tire.

Dayton gets this "heart" by a special Dayton process. Cords of Raytex (Dayton processed rayon cord) are used. They are lighter in weight and more resistant to flexing, so they generate less internal tire-heat. And they retain their greater tensile strength at high road temperatures.

These Raytex Cords are welded inseparably together, with new synthetic rubber. Then they distribute road-shocks and road-heat throughout the carcass of the tire.

Such a "heart" costs Dayton more, but it prolongs tire-life amazingly. And explains too, why with Dayton Thorobreds blowout trouble is rare!

And it accounts for Dayton's new, longer-mileage reputation, already predicted as outstanding for many years to come.

Althougn their supply is still limited, due to war demands, if you *can* get Dayton Thorobreds, then you, too, will achieve new mileage records, for wartime; and find new relief from mileage worry . . . with Dayton Thorobred Tires.

TIRES by **Dayton Rubber**

REG. TRADE MARK THE DAYTON RUBBER MFG. CO.

The Mark of Technical Excellence in Synthetic Rubber

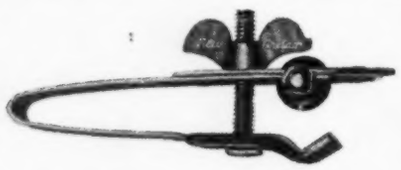
THE DAYTON RUBBER MFG. CO.
Co-operators of a Government Synthetic Rubber Plant
DAYTON 1, OHIO

Maintain Victory Speeds—Conserve Your Tires

* *Dayton Processed Rayon Cord*

Self-Feeding Pipe, Tube Cutter

THE new self-feeding pipe and tubing cutter, offered by New Britain Machine Company, is shown here. It's known as No. T-130 and will



handle all tubing, as well as copper, brass or lead pipe from ⅝" to 1" in diameter. It supplements the smaller size cutter which handles tubing from ⅛" to ⅝" and which was recently shown in this department.

After the tube is inserted in the cutter and tightened, it does not have to be reset, as the tension in the frame automatically gives a deeper cut on each turn, until the tube or pipe is severed.

This tool measures 5¼" long and weighs 6 ounces. A preference rating of AA-5 or higher is required for its purchase, according to the makers, New Britain Machine Company, New Britain, Conn.

•

Manual on Engine Valves

A NEW manual *"The Automotive Engine Valve"* has been published by Aluminum Industries, Inc. of Cincinnati. It is dedicated to automotive mechanics and servicemen with the hope that it will be of practical help in prolonging the useful life of today's essential automotive vehicles.

The author, Walter Trefz, Engineer, of Aluminum Industries, discusses the functioning and servicing of valves in non-technical and easily understood language. This text is profusely illustrated with photographs and diagrams that give a simple, clear-cut explanation of the subject.

What are the best materials for valves? What are bi-metal valves and why are they used? These and many other questions about valves, guides, springs, seat inserts and tappet clearances, are answered in detail.

One section of the book describes the causes of valve failures and their correction: Overheating, deposits from combustion and distortion of engine structure. How to restore the valve mechanism to its maximum performance is shown by the text on Valve Servicing, Condensation, Refacing Valves and Valve Seats, and Valve Assembly.

Written in the serviceman's own language, this guide book to correct valve procedure will be a real help to both the younger mechanics and the old-timers who have been through the mill of many years experience. . . . Copies may be obtained by writing to Aluminum Industries, Inc., Replacement Parts Div., 2438 Beekman St., Cincinnati 25. O.

•

Prevents "No-Oil" Damage

A NEW snap-action pressure switch is offered for use on truck and bus engines, to prevent damage due to low oil pressure or accidental running-out of oil.

When the oil pressure drops below a selected pressure range, the switch closes its contacts and can be used to energize a relay to shut off the ignition. Or, on Diesel engines, it can be used to close-off the fuel solenoid and thus stop the engine.

The contacts of the *"Clix"* switch as it is called, will carry 30 amperes and can also be hooked up to sound an alarm, if desired. It is available in four different pressure ranges from 0 to 28 pounds, with higher pressure also available on order. In-

stallation consists of hooking a ⅛-inch pipe connection into the switch and attaching ignition, relay or alarm wires.

Made by Hawk Tool & Engineering Company, 7663 Epworth Blvd., Detroit 4, Mich.

Three-Point Pipe Gauge

THE Three-Point Gauge Company offers a new model of its Three-Point Pipe Gauge, which will measure

instantly all sizes of pipe from ⅛" to 12", as well as all sizes of electrical conduit and metallic tubing.

The gauge is pocket size and consists of two pivoted steel plates with edges curved at three points for contact with the pipe or tubing to be measured. Scales are etched right on the gauge. These automatically show the size being measured. One scale indicates pipe, another tubing and the third the correct size of drill for tapping. At the bottom of the gauge is a handy inch and metric rule.

The makers state that this gauge can be used in almost any location, such as on pipes in corners, overhead, etc., as it is necessary to only contact a small section of the pipe or tubing contour. Covered piping can also be measured by placing the thin gauge between joints in the covering or in the small opening near any union or fitting.

For more details address Three-Point Gauge Company, 3821 Broadway, Chicago 13, Ill.

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Book Shows Speaker Progress

AN interesting and informative book that reviews the history of the company and features products available to the trade, has been published by the J. W. Speaker Corporation, 3059 N. Weil Street, Milwaukee 12, Wisconsin.

This company is a leading producer of tube and casing repairs for both natural and synthetic rubber—as well as the manufacturer of Heatabs, concentrated heating units for camp-stove cooking.

A copy of this new book may be had by writing the Speaker Company.

How to make tires last longer

How *long* tires last depends greatly on how *well* they are cared for. A sure way to see your tires get proper care is to put Fisk Mileage Service on the job.

Fisk Mileage Service is a simple but complete factory approved tire conservation plan that leaves nothing to chance. With it Fisk Truck Tire Distributors are helping hundreds of truck operators catch tire trouble before it happens, stretch tire mileage to keep busy trucks rolling.

Regardless of the make of tires you are using, regardless of the number of trucks you operate, put Fisk Mileage Service to work for you today. Call in the Fisk Truck Tire Distributor near you for full details.

FOR FISK MILEAGE SERVICE CALL YOUR FISK TRUCK TIRE DISTRIBUTOR

FISK TIRE
MILEAGE SERVICE

1 Increases tire mileage **2** Catches tire trouble before it happens
3 Cuts operating costs **4** Provides accurate tire service records
5 Supports applications for new tires

FISK TIRE COMPANY—Division of United States Rubber Company, Chicopee Falls, Mass.

Tire Chain Wall-Chart

A NEW wall-poster designed to show drivers and shop men how to conserve tire chains is being dis-

tributed to automotive fleet operators by the Pyrene Manufacturing Company, Newark 8, New Jersey.

The poster urges the use of tire chains to avoid accidents, illustrates the proper way to install chains, and stresses good driving plus prompt repair as a means toward longer chain life.

A sample copy of the poster, or a quantity for fleet garages and repair shops, will be sent to fleet operators by Pyrene jobbers or direct from Pyrene, upon request.

•

New Thompson Maintenance Manual

A NEW 250-page *"Know-How"* manual, prepared by Thompson Products, Inc., Cleveland, and aimed at helping thousands of inexperienced men and women who are doing wartime automotive maintenance work, is now being distributed to the trades through Thompson Products jobbers.

The *"Know-How"* manual takes the place of the company's larger and more technical Repair & Tune-up

Manual for the duration. Primarily it is a bench manual that gives short-cut procedures for tearing down and re-assembling the parts of an engine or chassis. It was patterned after the "G.I. Joe" military manuals that teach, for instance, how to quickly take a machine gun apart and put it back together.

Profusely illustrated, the text is spotted with "quickies" in bold-face type, giving the gist of an operation for the more experienced mechanic. For the novice, the "quickies" are amplified by more detailed instructions in smaller type.

Contents of the engine section cover the cylinder-block, crankshaft, flywheel, camshaft, timing gears, oil-pump, pistons, valves, water-pump, carburetor, fuel-pump, distributor, clutch, and engine specifications. An electrical section deals with starters, generators, etc., and chassis procedures include the transmission, universal joint, rear axle, steering, wheel aligning, front suspension, and brakes.

The cost of the manual was shared with the company by Thompson Products distributors, who have taken out the first lot of 60,000 copies.

•

New Goodrich Fastening Device

THE "Rivnut", an internally-threaded and counterbored tubular rivet which can be headed blind, has been developed by The B. F. Goodrich

Company, primarily for use as a nut plate in the attachment of De-Icers to airplanes.

In this picture the mechanic is using Rivnuts to attach a radiator-grille to its brackets, prior to re-installation on an automobile.

With a great many other applications, both on airplanes and in other industrial fields, the company has published a 12-page manual on the Rivnut, which is available upon request, since it is now offered for general use.

Complete description of the Rivnut in standard countersunk and flat-head types, and the grip range are given, as well as instructions for applying the Rivnut, two pages of charts giving all essential data, a description of both power-driven and hand tools for applying, tables on typical ultimate strength, strength in double-shear with no reinforcements, torque resistance of Rivnut keys, thread strength, shear and tension tests, and a page devoted to Rivnut weights.

For your free copy of this new manual address The B. F. Goodrich Company, Akron, Ohio.

Miley Brake Lining Chart

A NEW Flat Rate Brake Lining Chart that should be handy in figuring brake specifications and job

costs, is offered by L. J. Miley Company.

The new chart appears in handy 4-page form, listing practically every car on the road today, as well as Ford and Chevrolet trucks. It shows numbered sets to fit each application, or sizes of roll lining, and also the recommended grades to be used for various conditions.

Free copies of this new chart may be obtained through Miley jobbers or from factory representatives of L. J. Miley Company, Inc., 1060 W. Adams St., Chicago 7, Ill.

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South Bend Lathe Catalog

FEATURING tweny-one full-color lathe illustrations, this catalog completely describes all South Bend Engine Lathes, Toolroom Lathes, and Precision Turret Lathes.

Engine Lathes and Toolroom Lathes are shown in five sizes, ranging from 9" to 16" swing. There are two sizes of Precision Turret Lathes; ½" and 1" collet capacity respectively.

Complete specifications are listed opposite each lathe illustration giving

capacities, speeds, feeds, and dimensions. The balance of the 68 pages (11" x 8½") and 75 illustrations, is devoted to construction features of the lathe, lathe tools, and attachments for special classes of work.

Copies of Catalog 100-D can be obtained on request from South Bend Lathe Works, South Bend 22, Indiana.

WILLERS "LIVESTOCK PULLMANS" GO TO MARKET —100% Thermoid EQUIPPED!

The Willers Truck Service of Sioux Falls, South Dakota, operates a fleet of "livestock pullmans" hauling livestock to market through eight states. These units cover about 1,600,000 miles each year hauling thousands of tons of freight.

Willers drivers have an outstanding safety record, because Willers insist on courteous, safe driving. To help maintain this safety record all Willers units are 100% equipped with Thermoid Brake Linings. Speaking of Thermoid, Willers says: "We have used Thermoid Products for the past four years. We find them absolutely dependable and long wearing. This means important economy when you have 60 units to service. In addition to Thermoid Brake Linings, we use Thermoid Fan Belts, Clutch Facings, Radiator Hose and Booster Brake Hose."

Use Thermoid Brake Linings on your fleet. They give you that extra margin of safety and long-wearing economy. They stand up under the toughest service. You'll find them RIGHT the first time.

Pledged U. S. TRUCK CONSERVATION CORPS

JOIN NOW!

Thermoid

Custom-Built Brake Lining Sets • CBB Sets • Thermo-Blocks for heaviest duty

★ THERMOID COMPANY ★ *Trenton, New Jersey* ★

Brake Lining Chart, Catalog

A NEW simplified catalog of Gatke Blue Ribbon grooved brake lining sets, including an engineered brake

adjustment chart, has just come from the press.

Simplified listings by make, year and model of vehicle, afford quick reference in ordering sets and checking prices. The profusely-illustrated engineered brake adjustments, in handy chart form, are important aids to efficient brake adjustments with minimum loss of time.

Furnished free to motor service men and fleet operators on request to the Gatke Corporation, 228 N. La Salle St., Chicago 1, Illinois.

•

Lusco Plastic Seal

THIS is a new resinous base product containing a special chemical for repairing leaks directly into the combustion chamber of gasoline engines. It is guaranteed to repair these and other cracks in the head or block of the engine.

It is also claimed that this preparation exhibits a cleaning action which cleanses the cooling system at the same time the repair is being made. It works in all types of anti-freezes, as well as plain water.

The company also offers a 90-day service repair item in the form of cubes to be inserted into the radiator, for the repair of small block leaks. . . . For more details address C. F. Lusk Company, Cleveland, Ohio.

Catalog on Speaker Products

THE J. W. Speaker Corporation of Milwaukee, Wisconsin, offers a wartime catalog of all of its products available for immediate distribution.

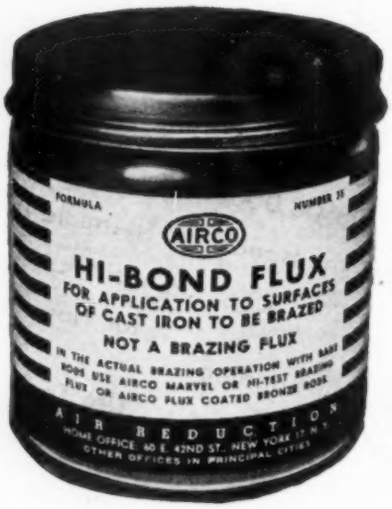
It is especially timely because it offers a new and unique line-up of tire and tube repair equipment which is vital to the war's rubber conservation needs. There are exclusive vulcanizing repairs for both natural and synthetic rubber that are now available for civilian use.

Also several new consumer items for resale now. Copy of this new catalog may be had by addressing the company in Milwaukee.

•

New Airco Hi-Bond Tinning Flux

THE Air Reduction Research Laboratories have developed a flux designed to promote uniformly successful tinning of cast iron prior to brazing. The manufacturer states that this flux, known as Airco HI-BOND, overcomes the difficulties encountered



in tinning cast iron due to its graphitic nature and makes possible satisfactory tinning of cast iron, especially of high carbon and silicon content or low combined carbon analysis.

The flux *does not* take the place of the regular flux used for the actual brazing operation. It may be applied as a water-mixed paste or as a powder sprinkled on the surface which has already been heated to the required temperature. It is packed in 1-lb. glass containers and is available from Airco offices and distributors throughout the country.

Additional details may be obtained by writing to the manufacturer, Air Reduction Sales Company, 60 East 42nd Street, New York 17, N. Y.

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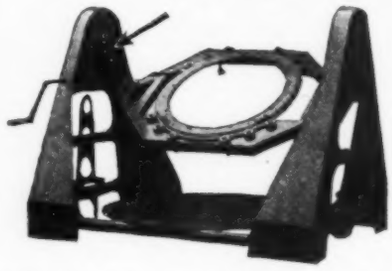
Literature on Rubber Products

PRODUCED especially for designers of industrial equipment as well as consumer products, The B. F. Goodrich Company, Akron, Ohio, has issued a general booklet on its industrial rubber products, which can now be obtained upon request.

Included in the booklet are discussions of the company's line of Vibro-Insulators, devices of rubber and metal which reduce vibration; molded, extruded, lathe-cut and sponge rubber products; rubber lined tanks and valves; products made with Koroseal, the company's flexible material created from plasticized polyvinyl chloride; V-belts and cements.

•

Portable Engine Stand



CLAYBORNE Manufacturing Company announces a new portable engine stand, illustrated here.

This particular model stand is designed to facilitate the assembly and overhaul of Pratt & Whitney and Wright aircraft engines.

The crankcase-bearing shaft is made of manganese molybdenum steel casting, is mounted on self-aligning bearings. The ring is made in two segments, to split for removal from engine after final assembly.

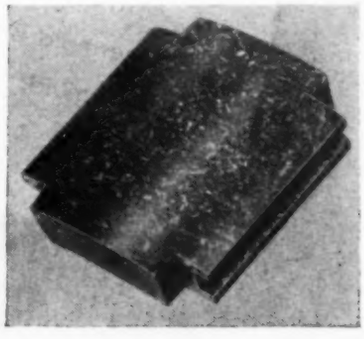
•

New Heavy-Duty Brake Blocks

RAYBESTOS has developed, originally for the Army Air Forces, a new brake lining in block form, called "1492"—so named because it is said to be a new discovery.

The new brake block is made by a new patented process which results in a lining of great structural density, with high resistance to wear and high temperatures, according to the makers.

In addition to war-proven performance on heavy bombers, tests already made on trucks, buses and industrial



equipment, indicate a wide acceptance in post-war civilian use.

The new lining is being produced at the rate of 15 tons a day, and should shortly be made available for civilian use. Further information may be secured from Raybestos Division of Raybestos-Manhattan, Inc., Bridgeport, Conn.

THE Thompson "Know How" MANUAL
FREE
To Customers of Thompson Products Jobbers
These "Sample Pages" Show How Illustrations, Diagrams and Simple Text Make Scores of Jobs Easier to Understand... Easier To Do
FOR THE Wartime
NOTE: This book is a temporary replacement for the famous Annual T. P. Repair and Tune-Up Manual which will again be available after the war when regular production of car models and engines is resumed. GET A FREE COPY OF THE KNOW-HOW MANUAL FOR YOUR SHOP NOW.

New "KNOW-HOW" Manual

can help every Auto Mechanic do BETTER WORK—EASIER—FASTER

PERHAPS we really should call this book a "Show-How" Manual. That's what this 300-page book does.

In simple language and with profuse illustrations and diagrams, it shows how to do over 800 operations—basic jobs in repair and maintenance of engine and chassis.

Each section in the book, covering engine, transmission, carburetor, pumps, steering, brakes, chassis, etc., is complete, showing not only how to take out and replace units, but how to take them apart and put them together again on the bench.

This manual is offered free through T. P. Jobbers, as timely, practical help to the thousands of new recruits—men and women—now in automotive service. Seasoned mechanics, too, find plenty in this book to make jobs easier and their work better.

Get it From Your Thompson Products Jobber

In the Automotive World

Auto-Lite Starts Heater Production

ELECTRIC Auto-Lite reports that it has been granted a "spot authorization" to resume civilian production of 3,500 automotive heaters, to be manufactured during the balance of this year. . . . The heaters will be assembled from frozen inventories of partially fabricated heaters, and the authorization is one to merely liquidate the inventory.

●

Heads Mack Bus Sales in Southern Div.

THE appointment of H. D. Mallison as manager of Mack bus sales in the southern division, with headquarters at Atlanta, Ga., is announced by Mack-International Motor Truck Corporation. . . . Mr. Mallison joined the Mack organization last month, after 20 years with the National Pneumatic Company. Previous to that he was connected with the Montreal Tramways in Canada.

●

Named to Industrial Relations Post

WHITE Motor Company announces that Henry G. Goehring, former assistant director of industrial relations, has been advanced to the post of director of industrial relations. . . . He succeeds Lon A. Fleener, who returns to his former position as manager of the wholesale division and brings to his new assignment many years of experience in the industrial relations field.

●

Captured "Twerps" Assist in Convoy Job

DARTING in and around convoys throughout the highways of France, the German equivalent of our amphibious jeep, nicknamed the "twerp" by members of the U. S. Army Transportation Corps, have "taken over" some of the convoy duties by leading the way and doing odd jobs along the route. . . . This captured equipment is economical to operate but the T. C. men had rather not trust them crossing streams—too many bullet holes.

●

Big Improvement in Snythetic Mixing

ONE of the most serious bottlenecks in the critical tire problem has been eliminated by scientists of The General Tire & Rubber Company research staff in Akron. . . . Gilbert Swart, General Tire research director, has invented a new method of mixing carbon black in synthetic latex which reduces the milling time 35 per cent.

Maine Highway Plans Are Proposed

THE Maine State Highway Commission has proposed a post-war road and bridge building program estimated to cost approximately $18,700,000. . . . The State has an unexpended balance of $10,239,000 in state and Federal funds accumulated during the current curtailment in highway construction.

●

Mysing Heads RCA-Victor Auto Radio

THE appointment of Hermann D. Mysing, well known in the automotive industry, as manager of sales and engineering service for RCA's Auto Radio Department, was recently announced. . . . Mr. Mysing's headquarters will be in Detroit; he joined RCA in 1935.

●

THE first hundred million are the hardest. . . . This is the 100,000,000th pound of snythetic rubber; it was turned out recently in a plant owned by the Defense Plant Corporation, operated by Goodyear.

●

Chilean Control of Natural Rubber

ALL natural rubber in Chile has been requisitioned and a Rubber Distributing Commission created in order that synthetic rubber received from the United States may be used most economically, according to the Department of Commerce. . . . The Commission will eventually determine the rubber articles to be manufactured and the proportions of crude, reclaimed and synthetic rubber used for such purpose.

●

Bath-Tub on Wheels for the Dutch

SATURDAY night services on wheels are to be offered refugees and others in the liberated Netherlands. . . . The Netherland Women's Auxiliary Corps soon will receive a motor vehicle equipped with hot water boilers and portable cubicles for offering emergency bath services.

Inter-American Road Bridges Unique

MODERN bridges on the Inter-American Highway, tying North, Central, and South America together, emphasize the strides that have been made in highway development since the earlier structures along the road were built. . . . Some of the bridges are of historic importance, such as the masonry structures that have been standing since the days of the Spanish conquest, while in other places vine or rope bridges hang high across a chasm or arroyo. . . . Wherever possible the more substantial structures of historic value are being preserved.

●

Virginia Will Issue Bridge Maps

THE Virginia Department of Highways announces that the first "bridge capacity and overhead clearance map" is nearing completion. . . . The map is expected to be of assistance to carriers of commodities requiring special equipment and will enable all operators of motorized equipment to readily route traffic over roads that will allow the passage of legal size-and-weight equipment over bridges and under overhead crossings, with the least trouble and delay.

●

Wood Too Costly as Tractor Fuel?

UTILIZATION of wood for generating producer gas for tractors is discouraged as uneconomic, in a report prepared by an agricultural expert in the Soviet Union. . . . The report states that since a tractor will consume annually the wood cut from about two and one-half acres, its general use as fuel for producer gas units would be too much of a drain on timber resources, even in a country having vast forests.

●

American MPs Have Their Hands Full

AMERICAN MPs have had their hands full keeping down the accident rate along the roads of France. . . . Lined with well-meaning civilians who try to give flowers to the drivers of the truck convoys, they sometimes get so close to the line of traffic as to endanger themselves.

●

New Road Carrier of Petroleum Gases

SOON to be seen on American highways is a modern highway carrier of liquefied petroleum gases with a lower center of gravity, designed to produce less side sway, and less wear-and-tear on tires. . . . These gases, a by-product of oil wells, are compressed into a liquid state and remain liquid as long as they are kept under pressure.

●

Cost of Gas Transport to Front Lines

LATE figures released show that it is far more economical to supply gasoline to the front lines in France, than it is over the Burma Road. . . . It costs 4/10 gallons of gas to deliver one gallon in France, while almost seven gallons are used in delivering one in China.

Swing Shift on the *Gearshift*

calls for the Best in safety lighting

● Offices close and workers go home, but drivers keep on driving. And dark roads are dangerous roads, unless trucks and buses have proper safety lighting.

Don't take chances with that all-important load! Standardize with K-D Safety Lighting—the quality line that gives *extra* protection. With K-D, you can count on dependable performance, on long, trouble-free service. With K-D, you can be sure of lower lighting costs, less highway delay. And all K-D lamps are highway engineered for safety.

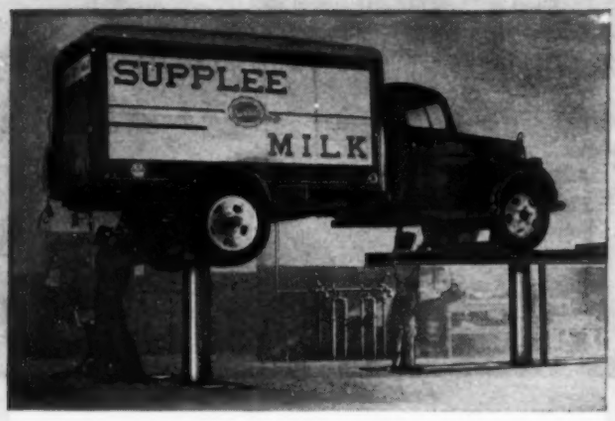
There's a K-D lamp for every safety need . . . clearance lamps, direction signals, mirrors, flares and reflectors. Your K-D Jobber has them all. He is ready to help you solve your safety lighting problems, with *the right light for the right job at the right price.*

THE K-D LAMP COMPANY • CINCINNATI, OHIO

K-D LIGHTING *The Right Light for the Right Job*

Preventive maintenance

begins on a GLOBE HOIST



Today—more so than ever before—your fleet of vehicles must be kept fit.

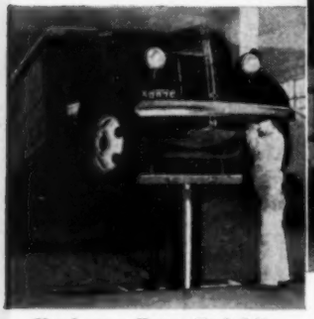
More revenue miles—more service is expected, regardless of age of vehicle.

More frequent inspection—unit overhaul is required to preserve your critical wearing parts.

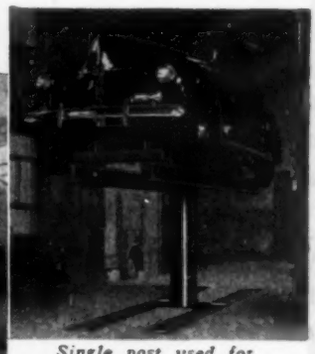
The biggest percentage of such work calls for access to the underside of the vehicle.

Manpower is scarce—so employ the GLOBE Universal Truck Hoist to save time—and enjoy accessibility quickly and with safety.

GLOBE HOIST COMPANY
Des Moines 6, Iowa
Philadelphia 18, Penna.



Used as a Front End Lift



Single post used for short-wheelbase Trucks or Automobiles

Globe Universal Truck Hoists—Wheel Dolly and Portable Pit Lifts—are available on W.P.B. limitation order L-270 to essential fleet operators.

GLOBE Universal TRUCK HOIST
HANDLES ALL WEIGHTS AND WHEELBASES

ODT Bulletin on Synthetic Tire Care

THE Office of Defense Transportation, predicting increased use of synthetic rubber in heavy-duty tires for the remainder of the war, has issued a comprehensive bulletin on the proper care and use of synthetic tires and tubes. Subjects discussed include:

Characteristics of Synthetic Rubber Tires; Tests Showing Relation Between Load and Tire Heat; Breaking in New Tires; Rotation of Tires; Mating of Dual Tires; Tire Inflation; General Running Gear Conditions; When To Recap; Synthetic Rubber Tubes; Tube and Flap Lubricants; Mounting Tires on Flat-Base Rims; Mounting Tires on Drop-Center Rims; and General Operating Suggestions.

Concerning vehicle loading the report states: "Even loading of a truck or trailer so that the weight is evenly distributed to all load-carrying wheels is a 'must.' In cases of doubt, the individual wheel loads should be checked. Checking the total weight of an axle is not sufficient, as this will not check bad load distribution across an axle which may cause a severe overload on one wheel and its tires.

"The rated carrying capacity of highway tires can be learned from the capacity table prepared by the Tire and Rim Association and the various tire manufacturers."

●

ACWP Estimates Time Needed to Convert

THE time element will be the principal controlling factor in reconversion of the automotive industry to passenger-car production. The Automotive Council for War Production has developed the following time table in answer to the question of "New Automobiles? When?"

V-180 days (six months before Germany is defeated): First machine tools must be ordered; engineering and testing begun.

V-90 days: Orders must be placed for parts, materials and sub-assemblies.

V-30 days: Preparations must be made for rearranging plants and installing new machine tools.

V-Day (Industry is given "go" signal)

V-Day to V plus 90 days: The reconversion period. Plants are rearranged, tools are installed, parts production starts.

V plus 90 days: Assembly of first few motors cars begins.

V plus 180 days: Production of automobiles reaches estimated rates; distribution of vehicles to dealers now in full swing.

The automotive industry has made recommendations to government agencies for preliminary steps necessary to meet this time table.

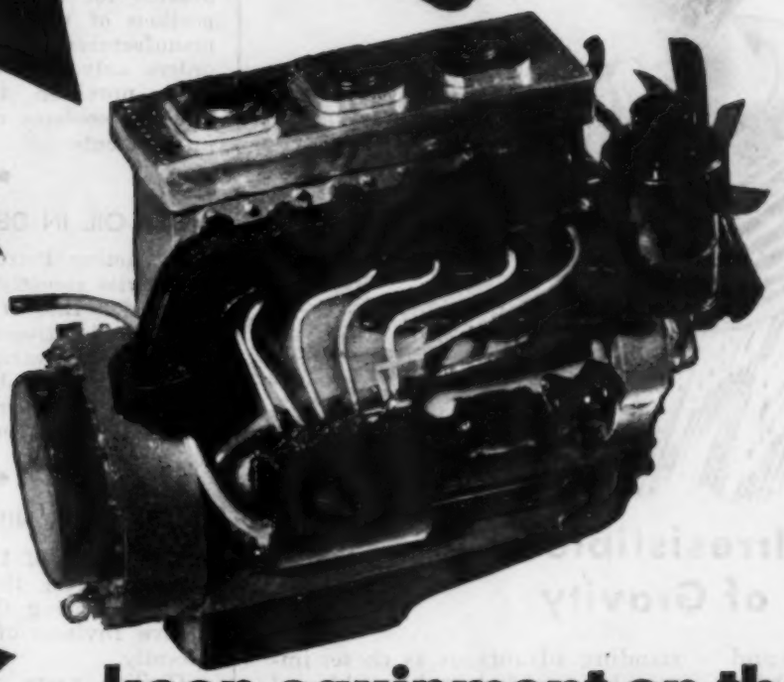
●

Things to Check Up for Winter Operation

HIGHWAY safety officials are calling attention to the need for checking car and truck defrosters, anti-skid chains, heaters, windshield wipers and antifreeze for winter driving.

Basic rules for safe driving under adverse road and weather conditions are given as follows: (a) Adjust speeds to conditions; (b) Slow down well in advance of intersections and curves; (c) Follow other vehicles at safe distances; (d) Apply brakes lightly and intermittently; (e) Signal intentions of stopping or turning.

Don't let a "LAZY" oil SMASH your Diesels...



...keep equipment on the "Go" with hard-working TALPEX

IT doesn't take long for a "lazy" oil to put an engine out of commission. How can you tell a "lazy" oil from a hard-working lubricant? You can't until the damage is done. For while a "lazy" oil may *look* like other oils, it doesn't act like one. It doesn't have the "staying" qualities to resist corrosion . . . the formation of carbon, sludge, lacquer.

A "lazy" oil may have *some* of the properties necessary to efficient engine operation. But that's not enough. To do a job of lubrication in today's overworked engines an oil must have *all* of the following properties of Shell Talpex.

NEW SHELL TALPEX

—**IS NON-CORROSIVE** to alloy bearings. Protects all lubricated engine parts against corrosion.

—**HAS EXCEPTIONAL OXIDATION STABILITY.** Holds to a minimum the formation of sludge, lacquer and other products of deterioration.

—**HAS HIGH DETERGENCY.** Helps keep carbon, lacquer and foreign particles from adhering to pistons and rings, valves, ports.

—**HAS LOW CARBON-FORMING TENDENCY.** Reduces ring sticking and wear. Lengthens engine life.

If the oil you now use doesn't have *all* these properties, it's lazy . . . should be changed to hard-working Shell Talpex. Ask the Shell man to show you why.

SHELL

TALPEX

THE NEW, ALL-PURPOSE, HEAVY-DUTY LUBRICANT

...trucks, busses, tractors, shovels, stationary and marine Diesels

Better
BECAUSE IT'S
Basic!

Basic and Irresistible as the Pull of Gravity

Because of its basic soundness and simplicity, the Bendix Starter Drive can be adapted to virtually any type of vehicle. It is in use today in over 60,000,000 installations—automobiles, tractors, tanks, trucks, jeeps, PT boats, and helicopters. The wide acceptance of the Bendix Starter Drive is based on such outstanding advantages as these: impossibility of damage by accidental engagement of the starter pinion; higher break-away torque which gives increased cranking power; rugged, durable construction; low-cost operation. Remember Bendix Starter Drive—*it's better because it's basic.*

Bendix Drive
ECLIPSE MACHINE DIVISION
BENDIX AVIATION CORPORATION, ELMIRA, NEW YORK

DISCUSS PARTS SITUATION

● The present manpower shortage, and *not* the lack of facilities, is the retarding factor in full production of automotive engines, the Industrial Liquid-Cooled Engine Industry Advisory Committee told WPB recently.

WPB officials said that labor shortages exist from the foundry level on up to finished products. Castings production is showing some improvement, they said, but engine builders still face labor shortages.

Chief discussion at the meeting concerned WPB regulations affecting the liquid-cooled engine industry. The eight-month "freeze" period on shipping schedules, provided in the amended Table 4 to Scheduling Order M-293, met with the approval of committee members as being more desirable than the previous three-month "freeze" period.

The reporting form WPB-3809, required by WPB, was characterized by John H. Middlekamp, director of the WPB Automotive Division, as intended to provide "the most important engines in the right place."

"This form is primarily a distribution medium, not a production medium," he said. "It is an inevitable result of war, when demand exceeds supply. WPB is trying to help the industry channel its products where most needed.

"Manpower is the reason for this distribution problem. WPB is seeking to give industry enough notice of where military requirements and necessary civilian demands will take place."

Provisions of the proposed Direction 2 to Table 4 were discussed, and met with some objections from committee members. This direction would provide for setting aside minimum portions of the parts in an engine manufacturer's hands to fill parts orders only. There also would be some provision for giving parts orders precedence over engine orders in shipments.

●

MORE OIL IN DECEMBER

● Acting Petroleum Administrator Davies recently announced that a production rate of 5,026,400 barrels daily of all petroleum liquid has been certified to various oil-producing states for December, 1944, an increase of 2,500 barrels daily over that certified for November production.

●

TRUCK RATIONING TO-DATE

● A total of 15,247 vehicles was released under the truck rationing program during October, the Automotive Division of WPB announced recently.

Civilian users received 350 light trucks, 7,975 medium and 2,574 heavy trucks and 2,499 trailers. . . . Holders of Government exemption permits received 1,555 medium trucks, 186 heavy trucks and 108 trailers. . . . Government exemption permits previously issued for 38 light trucks were canceled during the month.

Since the rationing program became effective March 9, 1942, a total of 320,038 commercial vehicles of all types has been released. . . . This includes 51,214 light, 188,923 medium and 45,313 heavy trucks and 34,588 trailers.

Applications by civilians for purchases of trucks are now made to ODT district and field offices and, when approved, certificates of transfer for purchase of these trucks are issued by the ODT Allocation Section.

●

ODT ADVICE ON WINTER CARE

● The need for cleaning and checking over the working parts of passenger-car engines, in anticipation of winter weather, was stressed last month in a 7-point program drafted by the ODT Vehicle Maintenance Section. . . . Practically all of the 7 points are basically elementary and well known to those who read this publication; so they will not be reproduced here.

To Get Good Truck Tire Performance You Must
Mount Tires Correctly!
LUBRICATE
INFLATE
DEFLATE
RE-INFLATE
DO IT RIGHT THE FIRST TIME
SERVING THROUGH SCIENCE FOR GREATER TRUCK TIRE MILEAGE
UNITED STATES RUBBER COMPANY
1230 Sixth Avenue • Rockefeller Center • New York 20, New York
THE FLEETWAY
U.S. TIRES

New Poster

AVAILABLE NOW ON REQUEST

Truck operators all over the country are writing us for this two color tire mounting instruction poster. It is supplied flat in 12" by 18" size for easy posting on your bulletin board. Would you like copies for use in your garage and distribution to your maintenance men? There is no charge. Just write your nearest "U. S." District Office or direct to Truck Tire Sales Department, United States Rubber Company, 1230 Sixth Avenue, New York 20, New York. Start getting better truck tire performance now—by mounting tires correctly.

Listen to the Philharmonic-Symphony program over the CBS network Sunday afternoon, 3:00 to 4:30 E.W.T. Carl Van Doren and a guest star present an interlude of historical significance.

SERVING THROUGH SCIENCE FOR GREATER TRUCK TIRE MILEAGE

UNITED STATES RUBBER COMPANY

1230 Sixth Avenue • Rockefeller Center • New York 20, New York

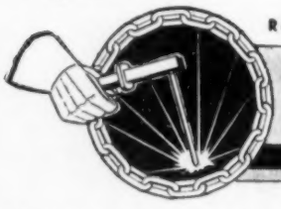
GET THE *most* FROM YOUR TIRE CHAINS

Find out how you can utilize odd sizes and old stocks

As Tire Chains come to you they are a proper fit for the sizes marked on the bag. But, with the shortage of Tire Chains, it is your patriotic duty to see that even *odd sizes* and *old stocks* are put to use. Often they are usable on popular sizes, although not a perfect fit. Others can be made to fit by cutting them down with a bolt cutter and salvaging the Cross Chains removed.

Ask your supplier how to use *old stock* and *odd sizes*. If he doesn't know, *he can get the information* for you from his Tire Chain Manufacturer.

Important Note: Don't throw away any old Chains! McKay Cross Chains can be used to rebuild them and thus save critical steel for the War Effort by repairing old Chains instead of buying new sets.



REGULAR AND BAR-REINFORCED MULTI-GRIP TIRE CHAINS

THE McKAY COMPANY PITTSBURGH, PA.

WELDING ELECTRODES . . . COMMERCIAL CHAINS . . . TIRE CHAINS

McKAY TIRE CHAINS ARE DISTRIBUTED THROUGH JOBBERS

Water Injection

(*Continued from page* 68)

experience with "water-injection" has made an enthusiast of the writer. His personal contacts with certain Army stations in this country have made this unofficial story possible.

Although little has been made public regarding the use of water-injection on engines of modern war-planes, the following has recently been released by the Ford Motor Company, and is reproduced here for whatever it may be worth:

"A special water-injection device that enables fighter pilots to obtain approximately one-third additional horsepower from their engines during emergencies, is now standard equipment on all Pratt & Whitney 2,000 horsepower engines built by the Ford Motor Company for use in P-47 Thunderbolts. This added power makes the engines among the most powerful in the world.

"When the pilot requires an added burst of power from his engine, he presses a button. A water regulator attached to the engine crankcase introduces a stream of water into the gas line, while a de-richment valve, attached to the carburetor, leans out the mixture.

"Added engine efficiency is achieved by leaning out the mixture. However, a lean mixture produces excessive heat by reducing the cooling action of excess gas inside the cylinders. Water-injection overcomes this by keeping the cylinder temperature within the bounds of operating efficiency while the engine is functioning on a lean mixture.

"Water regulator and de-richment valves automatically compensate for changes in atmospheric pressure and temperature. At frigid altitudes a mixture of 90 per cent alcohol and 10 per cent water is used. The device is especially valuable in combat, when added speed frequently means the difference between life and death.

"Water-injectors can be used only on engines utilizing spinners for vaporizing the fuel inside the engine. These revolve at supercharger speed—in the neighborhood of 23,000 revolutions a minute—and thoroughly vaporize the mixture of water and gasoline. Icing conditions would preclude the use of water-injection in a conventional, carburetor-equipped engine."

With due respect to the Ford statement that "spinners" must be used for vaporizing the fuel inside the engine, and that icing conditions would preclude the use of water-injection in conventional carburetor-equipped engines, the foregoing test experience of the Army (on truck engines) indicates that spinners are not necessary with the system described and illustrated in this article. And, so far as freezing conditions are concerned, freezing of the water can be prevented the same as it is prevented in a radiator—by adding a small amount

(*Please turn to page* 132)

CONVERT YOUR FREE TRUCK SPACE INTO BILLBOARDS WITH MEYERCORD DECALS

FREE! TRUCK VISUALIZER

Visualizer contains outline diagrams of body types, cabs, rear doors, tops, visors, side panels, etc., for sketching and arranging trademarks, lettering, etc. Also includes important data describing the most effective use of the free advertising space on your trucks. Send for your free copy today.

Truck decal illustrated is reproduced by courtesy of General Mills, Inc.

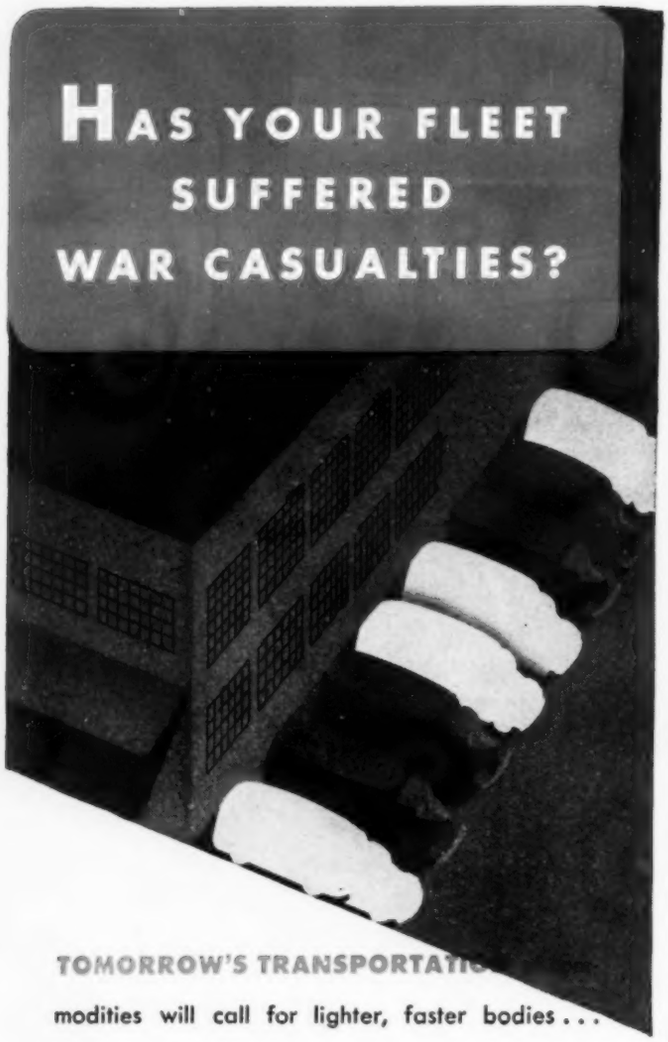
Here is a practical demonstration of "Rolling Billboard" advertising effectiveness . . . told with excellent poster technique through the powerful medium of free truck space—and Meyercord Truck Decals. Companies that SELL advertising space on their trucks charge as high as $240 per truck per year. Multiply this amount by the number of trucks in *your* fleet—to learn the value of *your* "Rolling Billboards" to advertise *your* product or service. Meyercord Decals are a durable, weather-tested method of truck decoration. They're economical for a dozen trucks or a thousand. Any design, in any size or colors, can be reproduced at a fraction of hand-painted cost, and fast overnight application saves labor, money, and idle truck time. Free design service. Write for Truck Visualizer. Please address all inquiries to Department **31-12.**

Buy War Bonds . . . and Keep Them

THE MEYERCORD CO.

World's Leading Decalcomania Manufacturer

5323 WEST LAKE STREET • CHICAGO 44, ILLINOIS



TOMORROW'S TRANSPORTATION modities will call for lighter, faster bodies . . . dynamic new designs.

DE KALB truck and commercial fleet bodies were good *before* the war . . . they'll be even better when they leave the blueprints for the streets.

NEW POSTWAR DE KALB truck and commercial fleet bodies now planned are the result of extensive research on the part of our engineering staff. (Production facilities at our De Kalb, Illinois, plant have been devoted to war uses.)

SALES GO WITH A BETTER BODY

For Those Returning Service Men to Drive . . .
NEW and BETTER Truck Bodies . . . by DE KALB

DE KALB
COMMERCIAL Body CORPORATION
Tomorrow's designs for Today
DE KALB, ILLINOIS

FCC Considers Highway's Radio Needs

THE Federal Communications Commission is currently conducting hearings to determine the need for allocation of radio wave lengths to highway transportation. One experimental allocation of short-wave radio frequency has been extended to a taxicab company in a mid-western city.

When the hearings close, the Commission will have the benefit of views of organized commercial motor vehicle transportation (truck companies, bus companies and taxicab companies) on the possibilities of improving highway transportation through the use of two-way radio.

Among the obvious uses of such equipment would be the dispatching of taxicabs without the necessity of returning to stations; closer control of shipping and passenger movement over the highways; quick contact with vehicle failures on the road; re-routing in cases of emergency, and accident and safety activities.

Advocates of two-way radio for highway transportation point out that it would be extremely valuable in the wide-open spaces of the West, where distances between telephone facilities are often so great as to cause extended delay in reporting emergencies or in getting in touch with drivers operating equipment over the roads.

•

Army Uses Trailers for "What-Have-You"

IN THE present mechanized war, the United States Army is using the motor vehicle trailer to put just about everything on wheels and move it in any direction at a moment's notice.

Military trailers range all the way from small two-wheeled units drawn by a foot soldier transporting portable radios or range-finding equipment, up to tank retrievers capable of hauling a General Sherman Tank on the deck and carrying it away to a field repair station.

The Signal Corps has a one-ton trailer which is a pigeon loft on wheels, used to transport carrier-pigeons close to the front lines where they can relay information back to battle headquarters. One-ton horse-van trailers are used to bring animals up to the front, fresh and ready to carry officers, whose efficiency is greatly enhanced in difficult terrain because they are mounted.

Among other things the Army also uses trailers as cargo carriers, buses, portable radio stations, map-reproduction studios, photographic studios, headquarters offices, laboratories, laundries, shoe-repairing shops, clothing-repair shops, shower-bath rooms, delousing units, loud-speaker equipment, telephone supplies, searchlight carriers, aircraft repair shops, instrument repair shops, field kitchens, hospital units and optical shops.

•

B-29 Sections Move Over Highways

IF YOU live on the route from Akron, Ohio, to Omaha, Nebraska, you may have been wondering about the mysterious cargoes being moved on police-escorted convoys over the highways.

It has just been revealed that they carried bomb-bay sections for the Army Air Forces' Superfortresses built at Akron and assembled in Omaha.

Special trailers were built to carry the sections, cradles were installed, highway routes were studied, underpasses and narrow bridges were checked for clearance, and state police of Ohio, Indiana, Illinois, Iowa and Nebraska were consulted before the first of the many convoys was routed.

IN AMERICA'S BIG TIME FLEETS

the "BUY" WORD for all OIL FILTER USERS!

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Now, more than ever before, you should be enjoying the clean oil insurance and vital motor protection WIX provides. These famous sock-type cartridges installed in your oil filters now, pay off in continued operation tomorrow! In terms of maximum oil life and really clean motors, they simply cost less and DO MORE—LONGER! That's why WIX is the "BUY" word among thousands of maintenance-wise fleet operators.

THERE'S A WIX WAREHOUSE STOCK CONVENIENT TO YOU!

ATLANTA • CHICAGO
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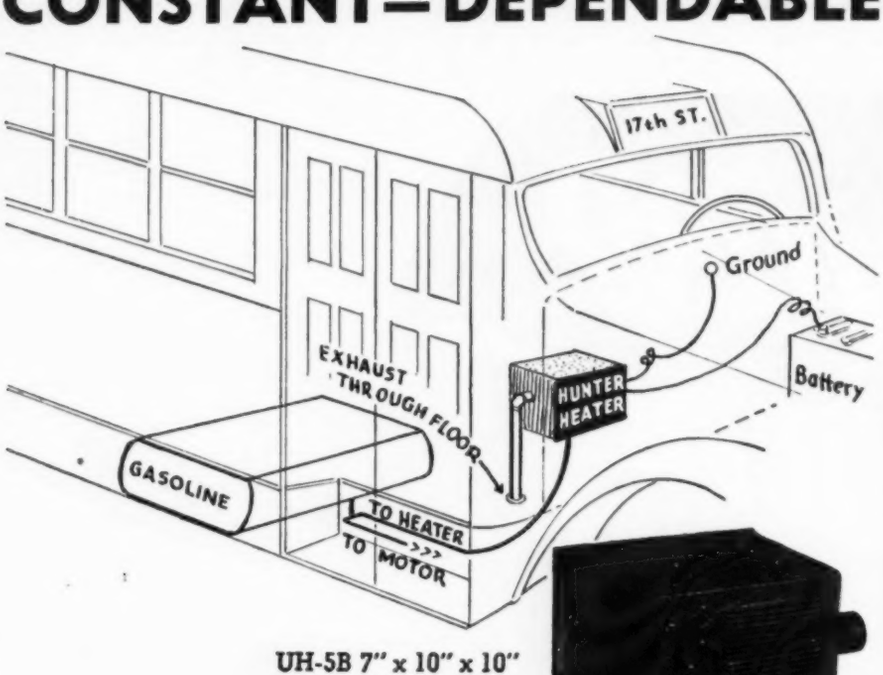
CONSTANT—DEPENDABLE



UH-5B 7" x 10" x 10"

BUS HEATING

HUNTER GASOLINE BURNING BUS AND CAB HEATERS are independent of engine operation.

The reason is that a Hunter Heater connects directly to the main tank, pumps its own fuel with a built-in Auto-pulse pump.

You can see by the schematic drawing above that installation need take but a few minutes. Four bolts, a connection to the gasoline tank, wires to the battery and ground, a hole for the exhaust.

Blower will not overload a good generator and battery set-up, can even be operated when engine is cut off.

Combustion is "Sealed-in-Steel", exhausts to outside of vehicle. Heat volume can be positively regulated, and is constant regardless of outside temperature.

DISTRIBUTOR TERRITORIES STILL OPEN . . . WRITE NOW FOR FULL INFORMATION

BULLETIN HG-4 **Describes all types of Hunter Heaters**

HUNTER AND COMPANY

Transport Equipment

CLEVELAND • OHIO

1544 EAST SEVENTEENTH STREET

Water Injection

(*Continued from page* 128)

of alcohol anti-freeze to the water in the tank.

Many engineers have been trying, since time immemorial, to create a miniature "rain-storm" inside of internal combustion engines. Perhaps, from this latest endeavor, it appears that they have at last struck "pay-dirt". Will water work wonders? Only the future will tell.

•

How We Salvage Wheels

(*Continued from page* 82)

can be swung in a 360° circle in the vertical or horizontal plane, but is prevented, once set, from changing its lateral or center distance from the hub, by two binder screws which clamp the tubes of the torch tightly in a two-piece revolvable and removable flanged block. The block is placed in a ring on the carrier which must be large enough to permit the head of the torch to pass through.

The counter-weights are just heavy enough to allow the torch carrier assembly to move down slowly by its own weight.* The cables were taken from a discarded speedometer drive and are run over small grooved sheaves.

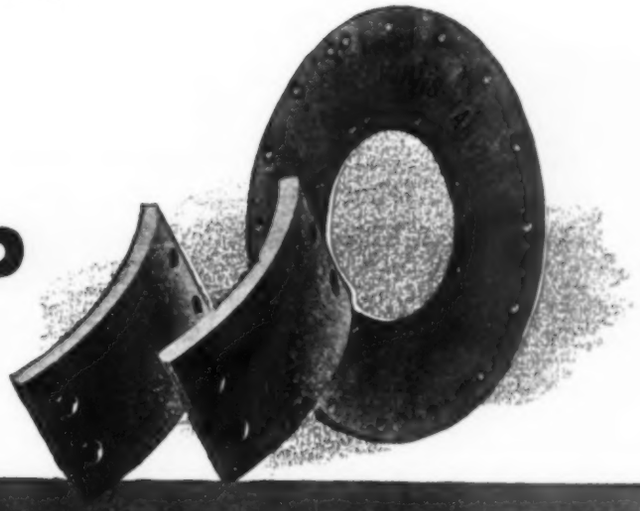
The wheels to be salvaged are set properly on the center guide, the stop pin is inserted, the cutting torch is set laterally in the most advantageous position regarding the cracked or broken part, and the cut is made on one side. The wheel is then transferred to the other guide post and the cut is made on the opposite side. We now have the damaged spoke removed and the cut is clean, straight and true. This wheel is then removed and the hopeless wheel with several remaining good spokes is handled the same way with the same lateral setting of the cutting torch. This, of course, leaves a gap when set in the fixture for arc welding, but this gap is readily filled and provides for 100 percent bond by the filler rod.

The set-up for arc welding is simple. The proper size spacer rim is slipped over the wheel and clamped tightly to two good spokes, evenly spaced. An extra deep "C" clamp is used so as to clamp the rim in the center of the length of the spoke. A ½-inch thick flat steel ring, 18¼-inch o. d. and 14⅛-inch i. d., notched out to clear the rim lug studs in the spokes, is clamped on the end faces of the fixed spokes; the replacement spoke is then set in place and clamped to the steel ring by means of a hand wheel, screwed onto the rim lug stud. The beveled felloe end of the spoke is brought snugly up against the spacer rim and clamped with another "C" clamp. The welder then proceeds to "tack" the spoke securely. After this is done, the plate and rim is removed and the regular weld is completed in the usual way.

The jig heretofore described cost

FOR 15 YEARS

MOST ME BUS TRANSPORTATION WINNERS



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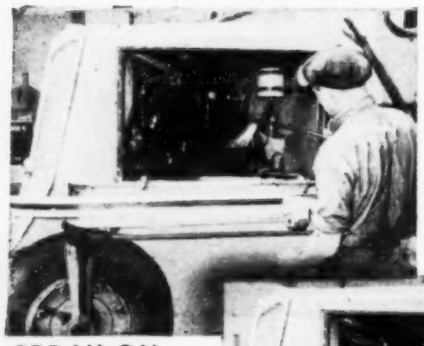
FRICTION MATERIALS

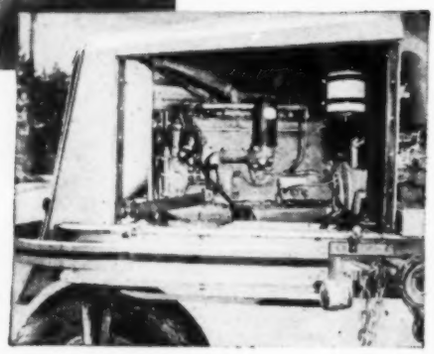
FLEET-TESTED SETS — BRAKE BLOCKS — CLUTCH FACINGS

JOHNS-MANVILLE JM PRODUCTS



SPRAY ON
LET SOAK

FLUSH DIRT
AWAY



A THOROUGHLY
CLEAN MOTOR
IN JIG TIME!

Clean Your Motors In Jig Time with MAGNUSOL!

GET THIS 64 PAGE CLEANING MANUAL

It's full of cleaning methods and short cuts to help you keep your preventive maintenance plan effective.

Any preventive maintenance plan must have clean motors to insure careful inspection for location of little troubles before they grow up! And remember that you need clean surfaces for adjustments and accurate repairs work. They're easy to get—those clean motors, if you use Magnusol. Safe, non-flammable, harmless to the skin—and non-odorous, Magnusol keeps the cost of getting clean motors, chassis, wheels, etc., down to a few cents per job!

MAGNUS CHEMICAL COMPANY
36 SOUTH AVENUE GARWOOD, N. J.

Magnus FLEET CLEANING MATERIALS

approximately $227 to build. Material, $8 for steel and angle iron, plus labor, $219 for machinists and welder. The salvaged auto parts used are not evaluated.

The entire assembly, as shown, weighs 205 pounds. It was built during September and October of 1941 and the first wheel job was done on it on October 6, 1941. The jig and process is not patented and any fleet operator is free to build one for himself. The basic design was devised by the author, with some modifications suggested by the two machinists who built it.

Savings effected are as follows: A new wheel costs $53.50. The average salvage time is two hours of labor at $1.40 per hour and two pounds of mild steel arc rod at .06 per pound. Oxygen and acetylene for the operation cost about .18. The proportionate cost saving, compared to the price of a new wheel is 94 percent. Our estimated annual gross saving is $3,210.

Should the number of wheels salvaged thus far (as this is being written) 20 in four months, continue at the same rate, it would mean that we would have had to purchase sixty wheels at the aforementioned gross cost.

Any large fleet owner faced with the same conditions, could cut his wheel costs at least 50 percent, bearing in mind that all wheels cannot be salvaged and some must be destroyed to obtain replacement spokes. It should be noted that overhead has not been included in these figures, as it will vary greatly as to locality and circumstances.

In these times when replacement parts are difficult or impossible to obtain quickly, salvaging processes must be employed as extensively as possible. It means a saving to the department or fleet operator—a saving in raw materials and productive man-hours that are so vital to our war effort. Thus the useful life and service of parts formerly junked is now greatly extended.

(Editor's Note: The foregoing article has been abstracted from a paper which received an award in the *"Maintenance Arc Welding Progress Program"*, sponsored by the James F. Lincoln Arc Welding Foundation, Cleveland, Ohio. . . . Its pertinence to fleet maintenance is obvious. . . . We are indebted to the Foundation, which furnished the basic text and illustrations.—*H.C.F.)*

•

Wartime Engine Bearings

(*Continued from page* 86)

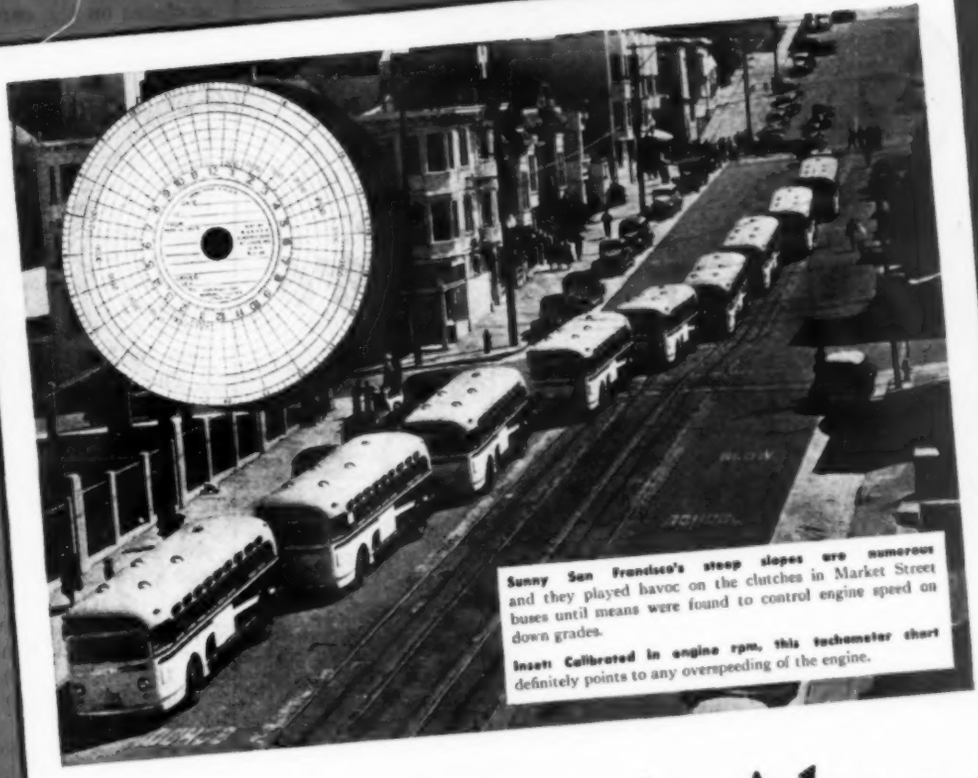
In adjusting for too much clearance between the back of the shell bearing and the cap, great care must be taken to avoid "overcrush" of the shell bearings.

Figure 2 shows what can happen from "overcrush". In one case of this nature which I observed, which, incidentally, occurred with a copper-lead bearing, the journal-to-bearing clearances seemed OK, but the job only lasted about 5,000 miles, when the bearing shells broke as shown. In the areas on each side of the cracks and on the high spots on the other shell, the copper-lead had spalled away from the steel backing and only these areas showed signs of contact with the journal. These areas were obviously out of contact with the rod and cap and failed for that reason. The balance of the copper-lead showed no signs of spalling or etching. When the shell broke as illustrated, a knock developed and the condition was discovered.

This problem of "overcrush" brings out a point that is frequently misunderstood in regard to thin shell-type bearings in connecting-rods equipped with shims. With thin-shell bearings, the ends of the two bearing shells butt together when assembled. The reason for this lies in the fact that the thin shells are usually not dowelled into the rod and, as a result, the edge of the shells will cut the shims.

With the shells butting together, the inside bore of the bearing must have the proper clearance with the journal. If this journal-to-bearing-surface clearance is incorrect, it can-

TACHOGRAPH (Recording Speedometer)
records and discloses important operating information



Sunny San Francisco's steep slopes are numerous and they played havoc on the clutches in Market Street buses until means were found to control engine speed on down grades.

Inset: Calibrated in engine rpm, this tachometer chart definitely points to any overspeeding of the engine.

Curing Clutch Abuse

How Market Street Railway found the solution to a troublesome clutch problem

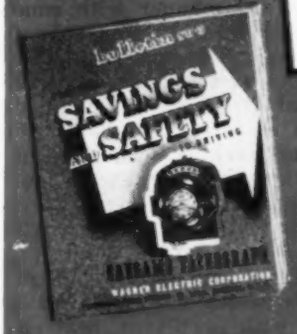
AN AMAZINGLY SUCCESSFUL METHOD of avoiding clutch trouble on hill operations has been developed by the Motor Coach Division of the Market St. Railway, San Francisco. Shortly before the war, this company had substituted motor buses for cable cars on some of its steepest hillside lines.

The change probably would not have been made if current equipment problems could have been anticipated. But since the step was taken, the company had to make the best of it, had to find ways and means of making coaches deliver maximum productive life on difficult terrain. Surprisingly, no undue amount of engine trouble developed but the problem of avoiding clutch wear became quite serious. Descending the steep hills, some of them 19½ percent grades, was found to be the principal contributing factor to early clutch mortality.

Experiments showed that the whole trick in avoiding this difficulty was to get operators to start down in low and to hold speed to a maximum of ten miles per hour. That proved quite a chore with green drivers. The first attempt at enforcement of this rule was made by putting signal lights on backs and fronts of the coaches—lights that would flash on if the engine was turning up more than 2,000 rpm. The idea was to have supervisors make constant checks. But when supervisory personnel became extremely scarce, this plan failed.

Now, the coaches have been equipped with tachometers for which the charts are designed to indicate engine revolutions rather than miles per hour. The instruments are of Sangamo design, distributed by the Wagner Electric Corp., St. Louis, cost the company about $75 each installed — and they've paid for themselves many times in prevention of clutch destruction. The minute a chart pops up showing that a given driver has taken a hill with his engine "reved" up to more than 2,000 rpm., he's called on the carpet. The evidence is positive. There's no argument about it. The men are shown that under present conditions no deviation from the rule on this point can be tolerated. As a result, clutch wear on the steepest grades is not greater now than on level runs. An accompanying photo shows one of San Francisco's many steep hills. The coaches lined up in this photo are awaiting dismissal school.

Write for Bulletin SU-3



The article reproduced above appeared on Page 54 of the June, 1944 issue of Bus Transportation, and is reprinted with permission of the publisher . . . Tachographs, of the R.P.M. and of the M.P.H. types are manufactured by the Sangamo Electric Company, and are distributed exclusively by the Wagner Electric Corporation . . . During the war Tachograph production has been curtailed —BUT Tachographs *are worth waiting for.*

AUTOMOTIVE PARTS DIVISION

Wagner Electric Corporation

6480 Plymouth Avenue, St. Louis 14, Mo., U.S.A.

SPEED WASH
FOUNTAIN BRUSH

Cuts Washing Time in Half

Washing trucks and trailers with Speed Wash gets amazing results with little effort and great speed. Clean, fresh water feeds right through the handle and tufts, so that each 12 inch stroke does a complete job of soaking, scrubbing and rinsing. There's no waste motion changing tools and back-tracking over the same surface. You can see how this easily cuts washing work and time in half, does a better job, and also saves the finish.

FULLY GUARANTEED

Put Speed Wash to work on your trucks. If it doesn't measure up to your expectations, return it for a full refund of your money. Order on this liberal basis today. Extend your priority of AA-5 or better, to insure prompt shipment. Make out your check or money order to Milwaukee Dustless Brush Co.

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"Dustless"—"Speed Sweep"—"Speed Wash"—brushes

Milwaukee Dustless
BRUSH COMPANY

524 NORTH 22nd STREET, MILWAUKEE 3, WISCONSIN

not be made correct by adjustment of the shims.

True, one can apparently make a correction in journal-to-bearing clearance by means of the shims, but actually any such shim adjustment primarily affects only the fit of the back of the shells to the bore of the rod. After the shell-to-rod fit has been made correct by adjustment of shim thickness, any further change of shims can only result in either "overcrush" of the shells or too loose a fit between the shell and the rod bore.

The clearance between the journal and the bearing surface on thin bearing must be corrected by changing the size of the inner bore of the bearing, either by the use of a different undersize or by boring the bearing to fit. Shims which do not fit between the butt ends of the bearing shells cannot be used to adjust journal-to-bearing clearance.

There are some connecting-rods which are equipped with thick shell bearings in which the shims come *between* the *butt ends* of the shell bearings.

With this construction, adjustment of the shims does change the clearance between the journal and the bearing surface but does not change the fit between the shells and the bore of the connecting-rod. To tighten this type of shell bearing in the connecting-rod, the cap must be corrected by carefully lapping down its mating face in the same manner as described for connecting-rods with no shims.

On rods which are not equipped with shims, there are two alternatives in reconditioning the rod. The best way is to broach or grind new mating surfaces on the cap and rod and then regrind the bore to a correct standard. Frequently, for various reasons, this cannot be done and, if in such cases the distortion is not too much, satisfactory repairs can be made by carefully lapping down the cap parting face, (See Figure 1). The cap should not be lapped below the point "A" as, under these circumstances, too much "crush" will be produced. These caps should not be filed, as the metal to be removed is very little, but the cutting down of the distorted ends is best done by lapping on a surface-plate.

The fitting of bearing shells to connecting-rods, by either the shim method or the lapping-of-the-cap method, poses a real problem in fitting. One way of checking this important fit is to "blue" the rod *very lightly* then insert the clean bearing shells that are to be used with that rod and fully tighten up the cap bolts. Next, disassemble the rod carefully and lift out the shell *without* a sliding motion. Examination of the back of the shells will indicate by light "blue" pickup where there was definite contact.

Areas where no "blue" pickup is found were not in contact. If there are areas of no contact, the cap can be lapped slightly or shims reshuffled to reduce their thickness not more than .0005" and the test procedure repeated. In this way, a condition of full contact between shell and rod in the high pressure areas can be approached. The job must be done in *small* steps, as "overcrush" is a very bad ailment. The secret of this method is a very light, uniform coat of "blue" and very small changes in the cap or shims.

Another advantage in using the shells, which are to be installed in each rod, as the checking medium for each rod is that a selective fit is obtained which will compensate for the manufacturing tolerances in the shells.

After the bearing shells are properly fitted to their backing perches, the clearance between the journal and the bearing surface can be checked in the conventional manner with small pieces of shim-stock or with dead-soft lead wire. Where bearings fail from heat, and this is frequently the case with the babbitt materials, I am of the opinion that the fit between the shell and its perch is much more important than the fit between the journal and the bearing surface. Variations of plus .001" are not serious in journal fits.

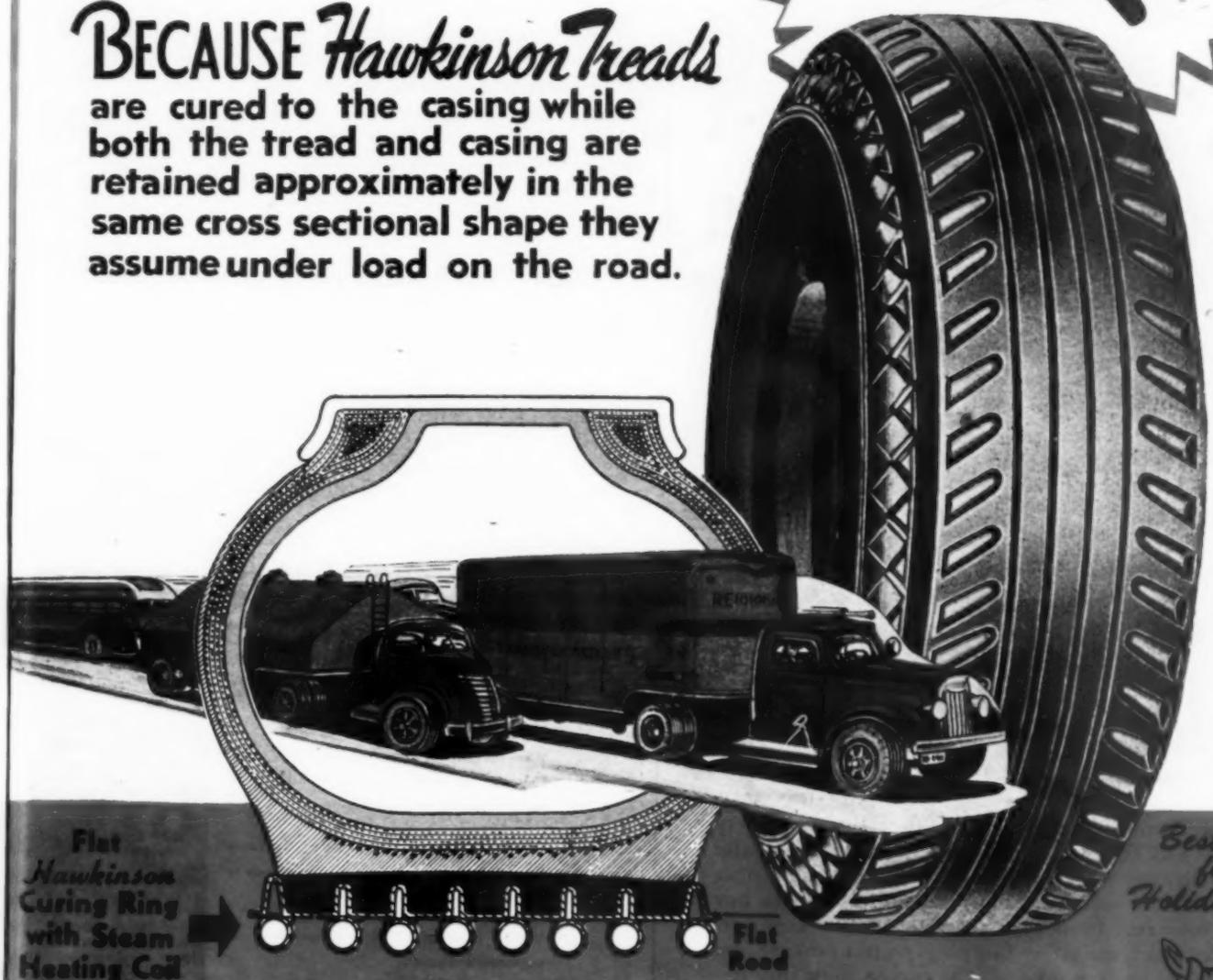
There are other dangers on connecting-rods which are designed to use shims with shell-type bearings.

(*Please turn to page* 140)

HAWKINSON TREADS

More than a Recap!

BECAUSE *Hawkinson Treads* **are cured to the casing while both the tread and casing are retained approximately in the same cross sectional shape they assume under load on the road.**



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ONLY *Hawkinson Treads* **are cured to the short circle rolling radius. This cannot be accomplished without curing the tread surface Flat and Short at the same time.**

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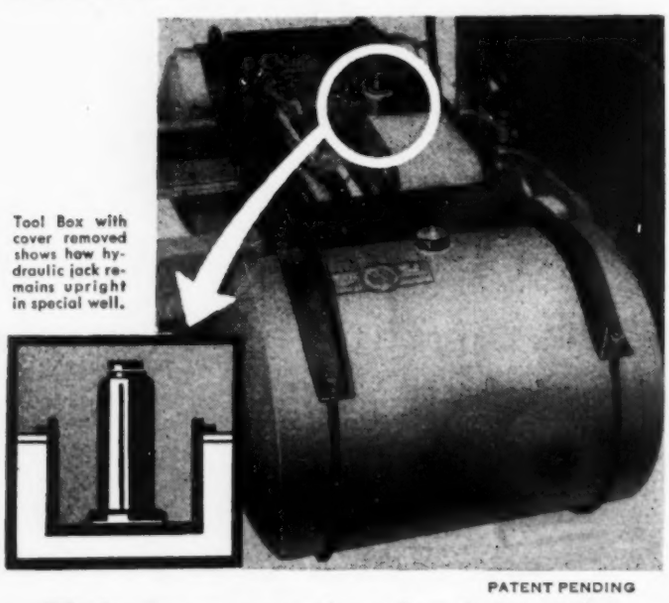
THE SHORT CUT TO GREATER ECONOMY IN 1945



Tool Box with cover removed shows how hydraulic jack remains upright in special well.

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Whether you own one truck or a fleet, the Prior Safety Tank and Tool Box assembly offers you a sturdy, safer way to carry large quantities of fuel, thus eliminating time-killing refueling stops, and enables you to buy all your fuel from your cheapest sources. Tanks are pilfer-proof, and safety fuse plugs protect tanks against explosion in event of fire. The curved angle iron suspension gives greater road clearance. The roomy tool box, with its special jack well, provides convenient and safe tool storage. If desired, a special storage battery well also can be provided.

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Please send complete information about Prior Safety Tanks and name of nearest dealer.

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PRIOR PRODUCTS

Dallas, Texas • Clinton, Illinois

Use of 2-Way Radio Saves Time and Mileage

BENEFITS of the use of two-way radio communications system of the Alabama Highway Patrol, cited in a recent survey, include:

(1) Constant communication with patrol cars and stations at all times while on duty; (2) Saving of time and many miles of driving in getting to and from scenes of accidents; (3) Uninterrupted escort of Army convoys through car-to-car communications; and (4) Quick dispatching of ambulances and wreckers to scenes of accidents.

The Alabama system is composed of eight 250-watt stations and five 50-watt stations with 100 50-watt mobile transmitters that can communicate from car-to-car as well as station-to-station.

The efficient service range varies from thirty to seventy-five miles, air line, depending upon the topography of the area across which the communication is held. Car-to-car communication is good in most instances of thirty to thirty-five miles, also depending upon location.

●

How "Red Ball Express" Speeds Supplies

A ONE-WAY, 200-mile speedway has been devised in France to enable motorized supply vehicles to keep pace with the fast-moving Allied combat forces, the War Department reports.

Since D-day the Motor Transport Brigade, commanded by Colonel Clarence W. Richmond, of Santa Monica, California, has been speeding food, ammunition, and gasoline to doughboys and tank squads. But when the break-through was accomplished and ex-

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30 YEARS OF SERVICE

Quality ELECTRICAL AUTOMOTIVE and AVIATION EQUIPMENT

When the guns started shooting over there, Cole-Hersee's organization answered the call and still made shipments for replacements.

The Military Forces still need Cole-Hersee Products and yet we continue to serve you to the best of our ability.

We are proud of our 30 years service to our customers and country.

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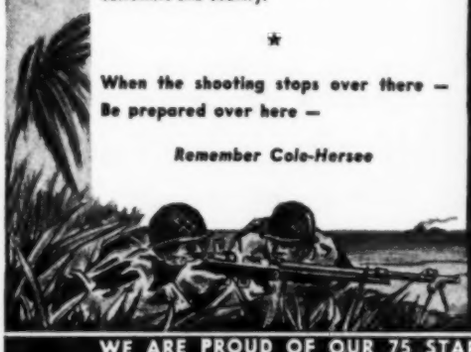
When the shooting stops over there — Be prepared over here —

Remember Cole-Hersee



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Line Connectors
Magnetic Solenoid Starter Switches
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Pilot Lights
Plugs
Push-pull Switches
Sockets
Starter Switches
Stop Light Switches
Switch Knobs
Toggle Switches
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WE ARE PROUD OF OUR 75 STAR FLAG

Cole-Hersee Company

54 OLD COLONY AVE. BOSTON 27, MASS

ploited by ground troops, the supply forces began to experience difficulty in keeping up with the advances.

As a result the new U. S. Army "Red Ball Express," probably the longest and fastest truck train in history, was inaugurated by Colonel Richmond and Brigadier General Ewart G. Plank, U. S. Army, Commanding General of the Advanced Section, Communications Zone, European Theater of Operations.

The highway is a giant loop that feeds the one-way traffic of thousands of loaded motor vehicles to the front lines and sends empty ones back to Normandy for more cargo. Trucks travel down one side of the loop and return on the other side. Every truck is labeled "priority" by a red disk on its front and rear. The same red ball is painted on the helmets of the special force of military police which controls the road.

To keep supplies moving steadily, vehicles are moved in large convoys, maintaing a constant speed and regular-spaced intervals. The convoys halt periodically for rest periods.

●

Federal Motor Vehicle Taxes Climb

HIGHWAY users are making increased contributions to the Federal Treasury through Federal excise taxes this year, despite war-time restrictions.

Federal excise taxes on automobiles and trucks, parts, tires, lubricating oil, gasoline and the automotive "use" tax during the first seven months of this year jumped to $337,200,000, from $317,188,000 in the same period of 1943.

TRACTOR CRANES

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Your big jobs...quickly, efficiently done

Here is a MATHER Tractor Crane, small, compact, maneuverable — that thrives on a 24-hour working day . . . will do your big jobs quickly, economically and efficiently.

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Capacity 3 and 5 tons. Gas or Diesel powered tractor unit, load carried on driving wheels; solid or pneumatic tires; all welded frame; boom 16' standard (longer booms available); tip spool or sheaves optional.

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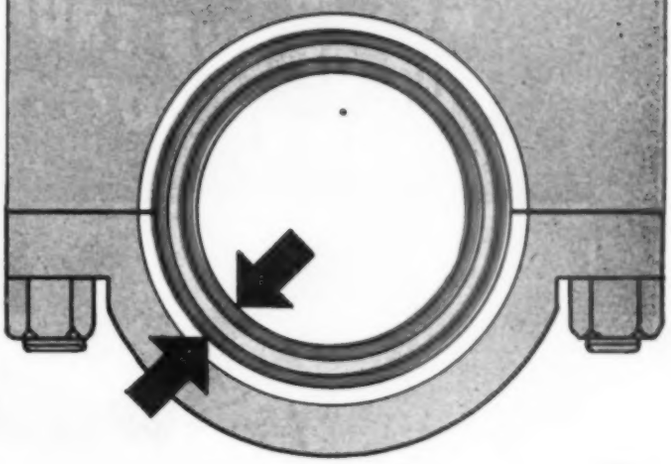
ARMOR PLATE the Oil Film with AVIEX



● USERS of AVIEX are continually telling about the longer service they are getting from vital engine parts. That's largely because AVIEX which has a strong affinity for metal and unusual wetting power actually armor plates the regular oil film between shafts and bearings, pistons and cylinder walls, or wherever metal-to-metal contact must not exist.

● AVIEX, therefore, not only furnishes initial lubrication (even in engines which stand overnight) but further protects the oil in the engine since the oil film actually "rides" between the AVIEX films on the metal surfaces. That means long life to parts, easy starting in cold weather, oil economy and less operating "headaches".

● Use AVIEX regularly—like other fleet operators. We'll tell you how.

● Treat Your Bulk Oil By Buying AVIEX in 55, 30, 15 and 5 gallon drums.

UNITED STATES AVIEX CO. NILES, MICHIGAN

Today's "Must:"

GET MORE WORK OUT OF THE TRUCKS YOU'VE GOT....

Here's the First Easy Step in Keeping a Truck BUSY

"Do the best you can with what you have"—you know that famous Order of the Day. In your business that means: Make your present trucks do more work! With new trucks mighty scarce, and getting scarcer—what else can you do?

But you can't do it with just "wishful thinking." First you've got to find out if your trucks are working as hard as they can right now. Are they losing time occasionally on their routes? Are they held up by delays here and there? Are those delays avoidable? What do you *know* about these things?

You may think—"when the truck is out on a trip, how can I tell what goes on?" That's where the little SERVIS RECORDER comes in. Install one up in the cab (see illustration above) and the truck will "write" its own work report for the day—a little chart showing you every stop and delay.

It pays to have the facts. Write for our booklet—*"Ten Ways of Getting More Work Out of Motor Trucks."* It's free. THE SERVICE RECORDER COMPANY, 1575 Euclid Avenue, Cleveland 15, Ohio.

The Servis Recorder

Tells Every Move Your Truck Makes

Wartime Engine Bearings

(*Continued from page* 136)

In view of the fact that the thin shells will cut through the shim-stock, the shims are arranged so that they are not assembled between the ends of the bearing shells. In such designs, if a piece of shim is inadvertently placed between the ends of the shell bearings in final assembly, too loose a bearing fit will be the result.

Other Causes of Bearing Trouble: The thickness of the bearing material in undersize bearings may also be a factor in poor bearing life. In the case of babbitt bearings, the additional thickness in bearing material to compensate for an undersize crankshaft, assuming the shell back is maintained at the standard sized bearing thickness, may permit rapid peening of the babbitt with resulting increased clearance and loss of oil pressure. The comments which have been made previously apply to main bearings as well as connecting-rod bearings.

The initial starting of the engine in which new bearings have been installed may be another source of trouble. Frequently, mechanics depend upon the normal oil circulation to take care of this initial lubrication and, in such cases, dry bearings may be turned over a number of times before oil is supplied by the engine oil pump. This initial dry operation may be the cause of later bearing failures. It is recommended that, with new bearings, the entire oiling system should be flooded with an independent source of oil, such as might be supplied by the conventional bearing tester.

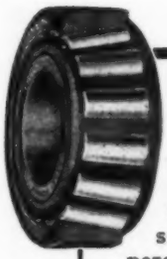
Another source of trouble with new bearings comes from dirt left in oil passages. Engines which are degreased with vapor cleaners need to have all oil passages scoured out after the degreasing. Rifle brushes should be passed through all oil lines to loosen any adhered abrasive particles and should be followed by a strong air blast. Any dirt left in an oil passage ultimately ends up in a scored bearing. Of course, any degreased, adherent particles should be removed from any other parts in the interior of the engine.

As engines grow older in use, other defects develop which are unusual with our customary pre-war practice. Many engines in common pre-war usage did not operate for 100,000 miles of service before they were retired to the junk yard. Now, such mileages are more common. One of the new defects is wear in oil pumps and this also has an effect on bearings.

Oil Pumps and Their Effect on Bearing Life: Oil serves two purposes in an engine. One is to lubricate the bearings and cylinder walls and the other is to cool the engine bearings. The limiting factors, in regard to engine bearings, are pressure, speed and temperature. If the temperature of babbitt bearings could be kept at about 100° F., it is very likely that babbitt bearings would be satisfactory for any of our automotive type engines. However, from the nature of mobile equipment, this is not possible, so that crankcase oils *do* reach high temperatures.

Insofar as a cooling of the bearing is concerned, the cooling is a product of the *temperature* of the cooling oil and the *amount* of cooling oil circulated through the bearing. In other words, a large amount of warm oil supplied to a bearing may keep its temperature low enough so that it will give satisfactory service, whereas just enough oil supplied for lubrication may permit the bearing temperature to rise to such a degree that bearing failure will result.

We have had a number of cases reported to us, in connection with over-the-road equipment, where auxiliary oil reservoirs have been applied to truck engines with small crankcases with an outstanding improvement in bearing life. This has been done in two ways, one by the addition of a tank connected by tubing to the crankcase and the other by a deepening of the oil sump by welding on an addition. In most cases where this has been followed, the crankcase capacity



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has been increased from six to ten or twelve quarts and sometimes more.

Assuming that there is ample moderate temperature oil in the crankcase, there is a problem of being sure that oil is circulated copiously to all the bearings. A good many years ago, when only plain piston rings were available, one had to be quite careful of the oil throw-off from the crankshaft, because the piston rings were not able to take care of the extra burden of wiping down too much oil. Now, with improved piston rings, one can be a little more generous with the amount of oil which is thrown up into the cylinders. With the advent of detergent type oils more throw-off is permitted, since the detergency additive tends to keep the oxidation products dispersed in the oil rather than permitting them to settle out in various places of the engine.

Detergent-type oils are still available to truck owners, even though they are not available to passenger-car users. Detergent-type oils are of real value to the over-the-road operator, where crankcase conditions are such that there is little chance for water to accumulate in the crankcase and to cause a water emulsion. With cold operating engines, the detergent oils may not do so well, since in these cases the water emulsions become the primary problem rather than the oxidation products developed by hot engine parts.

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Radiator Condenser Tank

(*Continued from page* 88)

ped over each of the short copper tubing ends, as shown, and clamps are used to make everything air-tight. A spark-plug gasket is used under the ⅞-inch filler-plug, to assure tightness.

"The operation of this condensing tank needs little explanation. As the engine of the car or truck warms up, the radiator liquid which formerly went out through the over-flow pipe, now is caught and condensed in the tank. Inversely, when the engine is stopped and begins to cool off, the liquid is drawn back into the radiator, due to the vacuum created by contraction on cooling.

"Once installed, the surge-tank becomes permanent equipment, for both summer and winter use, since it enables us to maintain better control of our radiator operation by using soft water and a rust-inhibitor. This should prevent the formation of rust, corrosion and lime-scale, and should make a decided reduction in engine maintenance costs, especially in those costs due to over-heated conditions. It should also render less frequent the need for periodic radiator cleanings.

"The use of this surge-tank also makes it possible for us to begin, early in the fall, to replace bad hose-connections, tighten cooling-systems and fill up with anti-freeze, and thus be assured that the solution will remain in the radiator through any warm weather that might later be encountered, such as in late fall and early spring."

It is quite possible that at this time many fleet operators may have to use the alcohol types of anti-freeze, even though they might prefer the permanent types. On the other hand, many operators may prefer to use the alcohol types, for various reasons of their own. And even those fleet men who prefer (and are lucky enough to get) the permanent types may find the installation of a surge tank of interest at this time, both as a consevration *and* a cost-cutting measure. To that

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end, the following "how-to-build" specifications of such a tank might be found interesting:

The photographs on page 88 of this issue are self-explanatory, especially the set of parts required, as shown in the lower (smaller) illustration. Part bearing number (1) is the tank itself, made of 26-gauge galvanized iron, 6 inches in diameter and 10¾ inches long; capacity 5 quarts. One end of the tank is fitted with a 5/16 x 1-inch copper tube, soldered in at the lowest point. At the other end (highest point), a 3/16-inch vent hole is drilled.

The brackets (2A) and (2B) are made of ⅛ x ¾-inch strap iron. C-dimension of each bracket should fit radiator stay-rods of vehicle on which it is to be installed.

The brass washer, to be used in place of the radiator cap, and soldered to the neck of the radiator is shown in (3). This is 2-inches in diameter (or the diameter of the neck) and is made of ¼-inch stock. It is drilled to take a ⅛-inch pipe fitting and a ⅞-inch S.A.E. thread, and holes of those threads are tapped.

The filler-plug to go into the ⅛-inch hole just mentioned is illustrated, (4), while the gasket for sealing this plug is shown in (5). A standard L-fitting, with ⅛-inch pipe thread, and taking a short length of copper tubing is shown in (6).

Three hose clamps are shown in (7), and the hose itself is shown in (8). Number (9) is a short length of hose, with one end plugged up to be used over the end of the regular overflow pipe, to seal it up.

So, now you have the material in picture and description; and it should be duck-soup to make these up in the shop. The materials are not particularly hard to get at this stage of the war. Difficult ones can be obtained through the use of your MRO priority rating—that is, maintenance, operation and repair. . . . As to the cost, the 1938 prices of the various materials, when bought by fleets, amounted to but $1.62; current prices should be a bit greater, but not more than $2.50. . . . . Installation cost can be figured at your own labor rate, the time being about one hour.

ODT and WPB officials, we understand, would like fleet operators to try this idea out on a large scale, the object being, of course, to help conserve critical anti-freeze materials, which may get really tight this winter. Besides, it is likely that once installed, such tanks will save much in the way of manpower, by changing "radiator-filling" from a daily to a monthly operation, and also they may prevent a lot of cracks due to overheating, freeze-ups, etc.

Summing up, here are the principal advantages which might accrue from such a device, properly installed, of course:

(a) Will permit the use of currently-available alcohol-base anti-freezes in cooling systems operating above 160° F. water-jacket temperature.

(b) Will result in a reduction of the amount of anti-freeze consumed, wasted or lost throughout the winter, and materially reduce anti-freeze costs, as well as save much critical materials.

(c) Will result in a saving in labor, as less attention will have to be paid to radiator checking and filling, possibly completely eliminating the necessity for adding anything at all. Also, much labor will be saved due to the less-frequent need for periodic radiator cleaning.

(d) Will insure the proper concentration of anti-freeze in the cooling system at all times, eliminating the

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necessity for testing for strength and saving many cylinder blocks and radiators from the scrap heap.

(e) Will protect against loss of anti-freeze in winter and rust-inhibitor in summer and will guard against the addition of waters of doubtful character to the cooling system, thus protecting against corrosion.

In conclusion, Dayton Power & Light Company was reported to have reduced its anti-freeze costs by about $600 the first winter in which radiator surge tanks were used on its entire fleet. ODT and WPB would be pleased to have you do the same, in the interests of conservation of critical anti-freeze components.

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Piston Ring Types

(*Continued from page 96*)

caused the cylinder walls to be damaged. It was found out that chromium could be successfully used on piston rings if the surface of the chrome-plate was made porous. A porous surface absorbs oil and also permits the hard chrome to seat properly and provides the necessary seal. The porosity is usually .001" to .002" deep and is produced by a special de-plating process. A remarkable thing about chrome-plating is that after the porous portion wears off, the rings keep on running without any bad effect whatsoever. It is possible that there are microscopic pores in chromium which have been given a chance to absorb oil and thus the usefulness of the chrome-plated ring is not ended when its manufactured porosity is worn off.

The above types can all be used with piston ring expanders or inner rings to augment the cylinder wall pressure or to provide piston stabilization. Steel segments are also used in connection with cast iron compression rings and expanders to produce a ring which not only has excellent sealing qualities but also acts as an auxiliary oil control ring, (Fig. 7).

Of oil rings, the slotted or ventilated types are still the most widely used. The simplest design is a compression ring which is slotted to provide a passageway for oil from the face of the ring to the back of the ring and then through holes at the back of the groove, through the piston to the crankcase. Higher unit radial pressure is achieved by cutting away the face of the ring with a circumferential channel. Oil-scraper rings are also used which involve one or two undercuts in the face of the ring. This not only increases the unit pressure of the ring but also provides space for oil to accumulate on the down-stroke.

Channeled and slotted rings, are also used with expanders to obtain higher unit pressure and the expander type oil ring is very useful for replacement in worn cylinders, (Fig. 8).

Even higher unit pressures can be achieved by using the steel segment type of oil ring, (Fig. 9). This ring consists of two narrow steel segment rings separated by a spacer which is ventilated to provide passage of oil. This combination is backed by a piston ring expander, the pressure of which acts through the medium of a steel segment, resulting in a high unit pressure against the cylinder wall. This is very effective in reducing thick films of oil such as we have when piston clearances are increased

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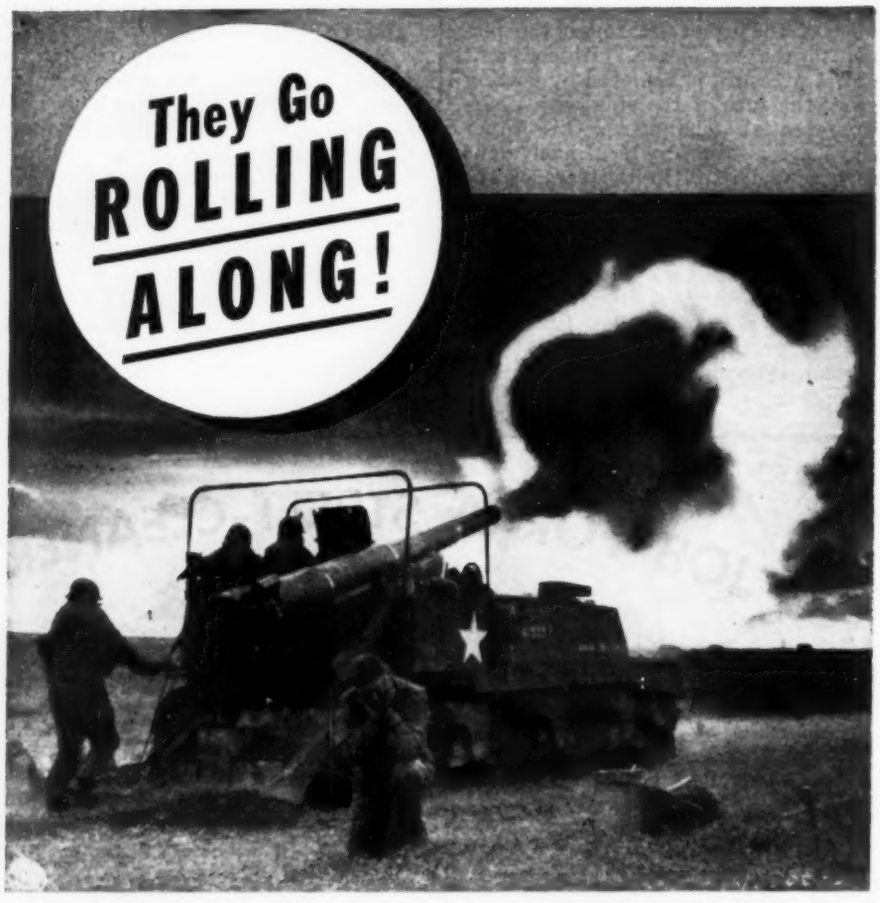

SIGNAL CORPS PHOTO

● Yes, the tune, "THE CAISSONS GO ROLLING ALONG" still rings true. In battles of every American war, the Artillery has made it possible for the Infantry to advance faster and with fewer losses. In this war the Artillery works with the Air Corps and Tank Destroyers to soften the enemy . . . pave the way for the ground forces.

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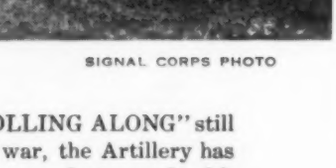
EDWARDS 

because of cylinder wear and when more oil reaches the cylinder because of worn connecting rod bearings.

At this point, I believe we should mention the expander type ring. An expander type ring is a combination of a cast iron or steel segment outer ring with an inner spring. In this type of ring, the piston ring pressure is developed in the inner spring and applied to the cylinder wall through the medium of the outer ring. Expander type rings are certainly not a new development but it has only been during the last two or three years that this type of ring has been recognized as a basic type of ring having a definite place. Expander type rings are standard equipment in several high-production engines and are recommended for replacement by almost all of the large engine manufacturers.

Inner springs are manufactured from high quality, high carbon spring steel which comes from the mill hardened and tempered. Before the war most of the piston ring expanders were made from Swedish steel. The advent of war has stepped up the development of domestic sources of Swedish-type spring steel.

Piston ring end clearances and joint clearances have increased during the past few years. This has been brought about by higher operating temperatures and the tendency of rings to butt, due to ring vibration impact loads. Side clearances have been increased to minimize ring-sticking and this has been permissible by the development of piston materials and piston groove designs which will stand higher inertia impact loads.

In conclusion, I would like to mention some of the problems which can be classified as "piston ring problems" and show how modern piston ring developments can be applied to solve these problems.

The control of blow-by and compression pressure has always been an important problem because it not only has an effect on the power output of the engine but also, if it gets out of hand, cylinders, pistons and rings will wear rapidly, resulting in short engine life. The oil will become contaminated and the lubrication of other engine parts will be impaired. Excessive blow-by and compression loss can be caused by cylinder distortion, piston distortion, insufficient lubrication and improperly machined grooves. When these factors are minimized by good engine design, then modern developments in piston rings can be applied with good results.

The application of thick-walled, narrow compression rings in the top groove, with the proper surface finish and with the added refinements of ring coatings, has done much to solve this problem. This ring can be supplied with a tapered face or with the upper inside edge beveled to provide a twisting action. In extreme cases of abnormal top ring wear due to scuffing, a chrome-plated ring can be used to advantage.

Scuffing usually starts with the top ring and spreads to the lower ring and piston skirt. The scuffing or excessive wearing of the upper ring can be minimized or eliminated and then the lower compression and oil rings will not be affected. Thus, it can be seen that the top ring acts as a sort of guardian and it is of utmost importance to design this ring for the highest efficiency.

Expander-type rings can be used in the lower grooves to minimize piston rocking and piston vibration, thus

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making it easier for the top ring to maintain contact with the cylinder wall, prevent barrel-facing of the top ring and retain its efficiency for a longer period.

Another important problem is that of high oil consumption. In modern high-speed engines it has been found that cylinder life is much longer if large quantities of oil are thrown into the cylinders from the region of the crankshaft. It is true that oil consumption can be controlled by metering the amount of oil thrown from the crankshaft. However, the best method is to have an oil throw-off much larger than actually needed for lubrication of the cylinders and then control this oil through the use of oil-control rings. A greater oil throw-off also means that the quantity of oil passing through the bearings is greater, providing very efficient cooling of the bearings. This is an important factor in bearing life.

In order to control generous amounts of oil, it has been found necessary to go to higher unit pressure oil control rings. The slotted and channeled ring mentioned above is very effective. However, in some engines it has been found necessary to increase the unit pressure by the use of a piston ring expander. Another way of reducing the oil film on the cylinder wall to the proper thickness is to use steel segment type oil control rings. This type of ring is effective in reducing the oil film at high speeds and is especially useful in engines having worn cylinders and where it is necessary or economical to avoid the expense of reboring and replacing pistons.

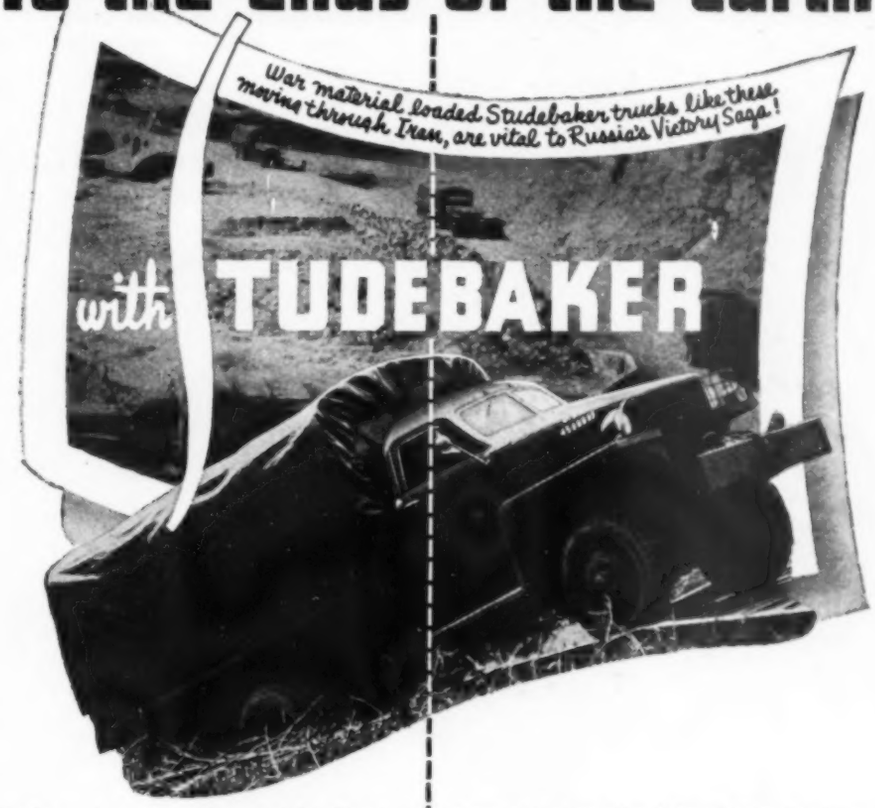
In the construction of the steel section oil rings, steel segments are used because it is difficult to make this narrow section using cast iron. Also, the cost would be prohibitive. Steel can be used at this point in spite of its poorer wearing quality because there is an over-supply of oil. The unit pressures are not so high that they completely penetrate the oil film.

It has often been mentioned that the use of expander-type rings increases the friction and lowers the efficiency of the engine. However, this is not strictly true because in order for the piston rings to function at all they must be riding on an oil film. Therefore piston ring pressures can be increased without a proportionate increase in the friction. I might mention here that as the quantity of oil to be controlled becomes larger, the amount of power necessary to control oil also becomes larger and this power loss is sometimes represented as a friction loss. Really it is just a small price that we must pay for longer engine life.

Another problem that has been discussed rather widely is ring-sticking. In order to eliminate ring-sticking, strict attention must be given to side clearances, accurate machining of piston ring grooves, and adequate control of blow-by. Ring-sticking is also aggravated by the type of oil which is used. Some of the older oils had a tendency to form sludge and oil varnish, which will cause ring-sticking. Detergent oils can be used, which will minimize the formation of carbon.

Excessively high temperatures are also one of the primary reasons for ring-sticking. This means that the cooling system must be designed properly and be in good condition. When all of the above factors are taken care of as well as possible, the application of the conventional compression rings mentioned above should produce sat-

To the ends of the Earth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isfactory results. However, in stubborn cases, the tapered side or wedge compression ring can be applied to advantage.

In presenting this review of modern developments in piston ring design we have, for the sake of brevity, left out much supporting information. We hope, however, that we have given a broad picture that will be beneficial in appraising general internal combustion engine problems. (This article is abstracted from a paper presented recently by the author, before a meeting of the Society of Automotive Engineers.—*Ed.*)

Brake Drum Reconditioning

(*Continued from page* 80)

no farther, as shown in Figure 17. The tubular section of the rivet should protrude from the shoe a distance equal to the diameter of the rivet. The diameter of the rivet head shold be at least 1/64 inch smaller than diameter of the hole drilled in the brake lining. A roll set should be used for riveting. A star set might split the tube and the rivet would not fill the hole. (See Figure 18.)

When the lining is to be secured by bolts, it is generally furnished with 82° counterbored holes, although sometimes flat, counterbored holes are found. The proper degree bolt head must be used to insure the continued tightness of the applied lining.

A relined shoe should be carefully checked for proper arc and fit to the reconditioned drum with which it is to be used, as it is highly important to have the maximum area of contact between the friction material and the drum wearing surface. The arc may be checked by fitting the relined shoe in the drum, as shown in Figure 19, and checking clearance at various points with a feeler gage. It is recommended that no greater than an 0.004 inch clearance be allowed between drum surface and the brake lining at any point.

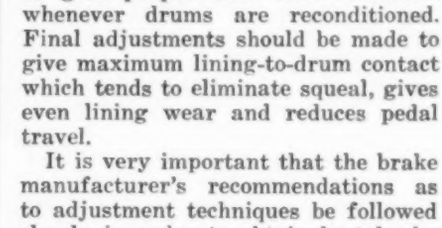
Various methods are employed to fit the shoe to the drum, such as grinding the lining surface or shaping the shoe in a shoe vise. The latter, however, cannot be done with cast shoes. There are different methods of grinding the lining surface. With all methods, however, the object is to obtain full lining contact without sacrificing any more lining thickness than is absolutely necessary.

Brake block segments are manufactured in standard oversizes to accommodate reconditioned brake drums. It is desirable to turn or grind the drum to fit one of the standard oversizes.

On brakes having adjustable anchor-pins, the pins should be adjusted to give proper shoe heel clearance whenever drums are reconditioned. Final adjustments should be made to give maximum lining-to-drum contact which tends to eliminate squeal, gives even lining wear and reduces pedal travel.

It is very important that the brake manufacturer's recommendations as to adjustment techniques be followed closely in order to obtain best brake operation.

The recommendations of the brake lining manufacturers as to type of lining to be used for various operating conditions will be found most satisfactory, as a general rule. Their recommendations should be followed, unless unusual operating conditions



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result in poor brakes, aggravated cases of wear or defects of the type discussed at the beginning of this report.

•

Detergency or Dispersancy?

(*Continued from page 72*)

relative improvements gained by the change to heavy-duty oil, compared to those gained by more careful engine maintenance and operation.

There is little question but that the change to heavy-duty oil contributed to improved engine cleanliness in this fleet, but there is likewise no argument that the program of better engine maintenance was also a most pertinent factor. In any event, the combination of heavy-duty oil plus more careful engine maintenance got this truck fleet out of serious contamination and sludge deposit difficulties.

Figures 1 through 4 serve to illustrate what can be accomplished by the so-called "detergent" constituent of heavy-duty oils. These photos also illustrate that heavy-duty oils perform two separate functions; namely, to minimize engine deposits and dirtiness derived from oil oxidation, and those derived from contamination of the crankcase oil with combustion chamber blow-up products—chiefly soot and carbon in diesel engines and lead compounds in gasoline engines.

Figures 1 through 4 also involve the question of "detergency or dispersancy in heavy-duty oils?". All of these tests were started with clean engines and their condition at the conclusion of the respective tests indicated the ability of the various oils to either permit or prevent sludge and deposit accumulations. No question of cleaning up dirty engines was involved, so that in all of these examples the property of "dispersancy" was evaluated rather than that of "detergency".

In order to study more directly the actual detergent action of heavy-duty oils, a series of tests was run starting with dirty engines. In the preliminary laboratory engine tests, a procedure was developed to prepare dirty engines having quite uniform deposits, so that direct comparisons of the detergent action of various types of oils could be made. (*Editor's Note:* Because of the lack of space, details and photographs of the laboratory tests are being omitted; we now skip along to the road test data and photos, which will perhaps be of more interest to fleet men, anyway).

The second phase of the study of detergency versus dispensancy consisted of a series of road tests. A variety of truck engines in different types of service and which had become quite badly fouled with sludge and deposits from operation with straight mineral oils, were run from 1,000 to 10,000 miles with heavy-duty oils. In each case, the engine was opened up at the start of the test for observation of deposit condition. Deposits were not removed or disturbed. In each test at least 3 drains and refills with heavy-duty oils were made and at the conclusion of each test the engine was again opened up for observation.

Figure 5 shows two pistons from light truck engines operated in city-delivery service wherein considerable difficulty with cold engine contamination sludges was encountered. The left-hand piston is typical of that found in several of the engines in this fleet after some months of operation with straight mineral oil. As indicated, oil-ring fouling was preva-

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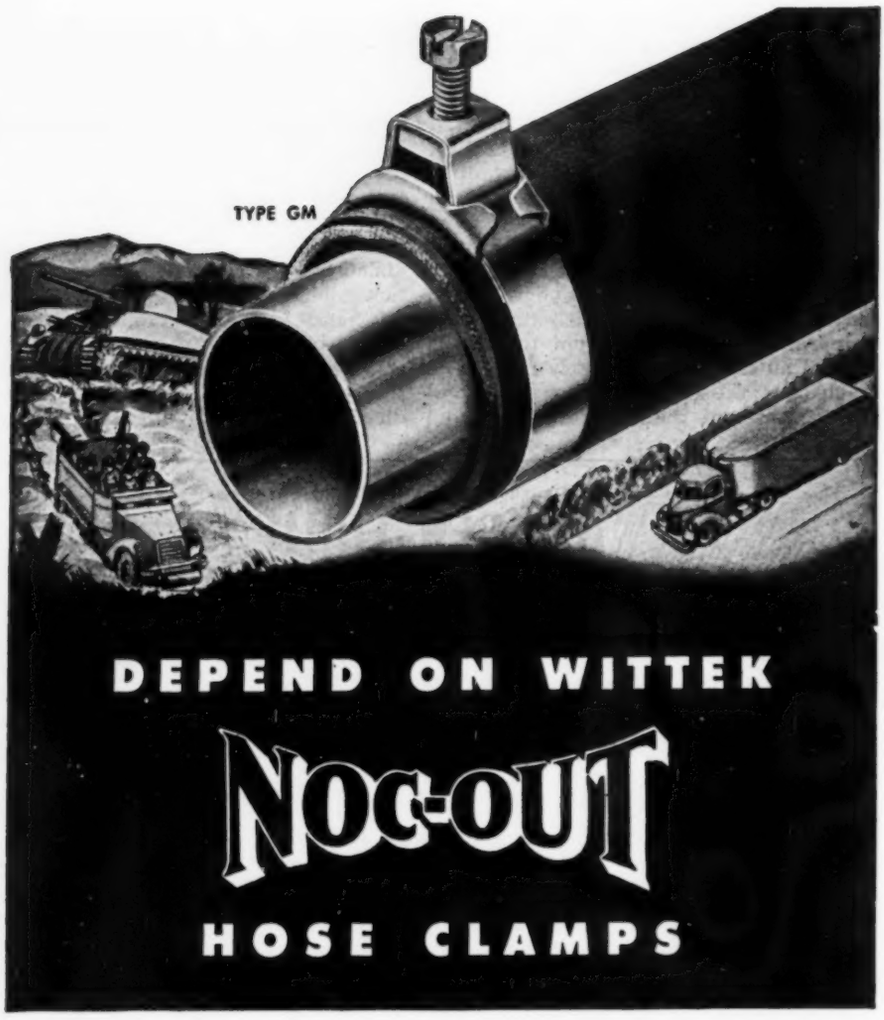

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lent and the piston skirts were coated with quite heavy deposits. The oil-ring deposits were of a soft, pasty nature and consisted chiefly of lead compounds and soot. The piston skirt deposits also contained considerable lead residues bonded to the skirts by sticky oil oxidation resins. Although these skirt deposits were fairly heavy, in no instance were they found to have developed to the point of causing piston-sticking in the cylinder bores.

The right hand piston in Fig. 5 is typical of those from engines in this fleet after operation for 1,000 to 2,000 miles with heavy-duty oils. There was a noticeable improvement in oil-ring condition and appreciable reduction of piston skirt deposits. The heavy-duty oils used thus displayed fairly effective detergent action in removing soft, pasty deposits from the pistons.

Figure 6 shows push-rod cover plates from engines in this same fleet. The upper plate is typical of that from engines after operation with straight mineral oil. Heavy, rather hard and adherent deposits, composed chiefly of lead compounds, were prevalent. The lower cover plate is typical of the condition found after 1,000 to 2,000 miles operation with heavy-duty oils. As shown, there was practically no change in the deposits and little or no evidence of removal by the heavy-duty oils.

The general experience in this test series was that such engine parts as oil-rings, piston skirts, crankcases and lower engine surfaces were appreciably cleaned and freed of soft, pasty, contamination sludges by the heavy-duty oils. On the other hand, engine sections such as valve-chambers and push-rod and rocker-arm compartments, where oil flow was limited and where the deposits tended to be of a harder, more adherent type, were not appreciably cleaned or benefited by the heavy-duty oils.

Peculiarly enough, in all cases where oil-pump screens were found to be heavily-coated with deposits, the heavy-duty oils displayed little or no cleaning action, in spite of the vigorous oil flow at this point in an engine. In most instances, oil screen deposits were packed to a hard, adherent and granular coating which was not susceptible to removal. In several instances the oil screens were found to be dirtier and more heavily plugged after the runs with heavy-duty oil than before. In such cases, sludges loosened from other parts of the engines were apparently carried to the oil screen, thereby increasing the deposits.

Figure 7 shows two typical pistons from a heavy-load, long-haul fleet operation. With straight mineral oils, considerable difficulty with ring-sticking and oil-ring plugging was encountered, although the balance of the engine interiors remained reasonably clean and free of excessive deposits between overhaul periods. Typical engine service in this fleet apparently accentuated oil deterioration from high piston temperatures, while oxidation of the bulk oil in the crankcase or excessive oil contamination from low engine temperatures were not an appreciable factor.

The left hand piston in Fig. 7 is typical of those found in engines in this fleet after 20,000 to 40,000 miles operation with uncompounded oil. Compression rings showed partial to complete sticking, the oil-rings were badly fouled with hard carbon deposits, and the inner and outer pis-

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ton surfaces were coated with baked varnish films. These piston deposits apparently originated as oil oxidation sludges which built up on the pistons and then baked to hard, adherent varnish films and coke-like or carbonaceous deposits in the ring grooves and oil ring slots.

The piston on the right in Fig. 7 is typical of that from engines after 5,000 to 10,000 miles of operation with heavy-duty oils. As shown, no appreciable removal of deposits resulted from the use of the additive-treated oils. This experience confirms that reported previously, that heavy-duty oils possess little cleansing or loosening action on deposits of a hard, adherent or baked character.

In summarizing the results of these tests, as well as numerous similar tests in other operations, the following conclusions seemed justified:

(1) *Heavy-duty oils can exert appreciable detergent or cleansing action on engine deposits of a soft, pasty and readily loosenable nature, particularly on those parts of an engine where copious oil flow or vigorous oil circulation occurs.*

(2) *Heavy-duty oils display no appreciable detergent or cleaning properties on engine deposits of a hard, adherent or baked type or on those parts of an engine where oil flow and circulation is limited.*

Another interesting and significant condition related to oil detergency was observed during the course of the road tests. In two instances addition of heavy-duty oil to badly-fouled engines resulted in disruption of oil circulation and loss of oil pressure such that the engines had to be shut down to avoid possible damage from lack of lubrication.

In the one instance, a diesel engine in fluctuating load operation had become badly fouled with mayonnaise-like deposits composed largely of soot and carbon particles. Within a few hours after the addition of the heavy-duty oil, the oil pressure began to fluctuate from the normal 40 to 50 pounds to almost zero so the engine was shut down. Upon inspection, it was found that considerable of the soft sludges had been loosened from the crankcase and lower engine surfaces. The large amount of solids which then became dispersed in the oil caused it to become extremely thick and viscous. Also, numerous lumps of sludge which had become loosened, but not thoroughly broken up and dispersed, had been carried to the oil pump screen, plugging it completely.

In the second instance, a gasoline engine had become heavily coated with oil oxidation sludges from extended operation with an unstable type of straight mineral oil. Some of the deposits were of a grease-like consistency but there was also considerable granular material of the "coffee-grounds" type. Shortly after the addition of the first charge of heavy-duty oil, loss of oil pressure was noted. As in the previous example, the heavy-duty oil had loosened up considerable of the sludges from the lower engine surfaces and although the soft sludges were dispersed in the oil, the granular, "coffee-grounds" were carried to the oil screen and pump intake, causing almost complete plugging and cessation of oil flow.

In both of these experiences, it was fortunate that loss of oil pressure was noted in time, so the engines could be shut down, otherwise serious engine damage would most probably have resulted.

CONCLUSIONS: The test results as

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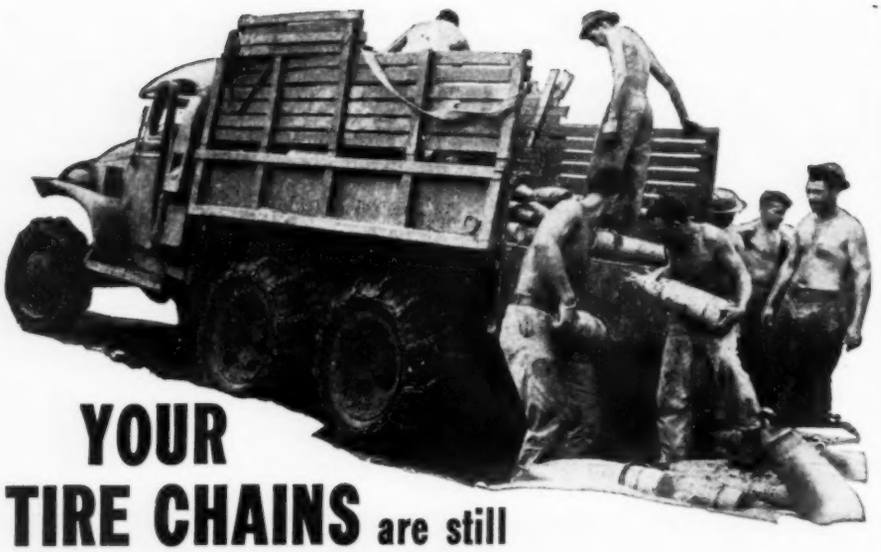

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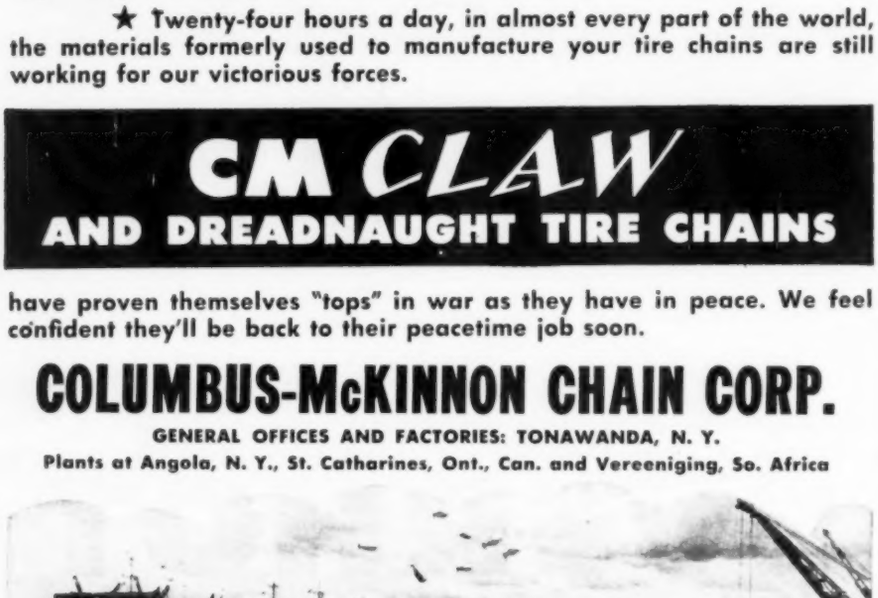

reported in the preceding paragraphs indicate that the essential function of heavy-duty oils should be defined as dispersancy rather than detergency. Although heavy-duty oils *do* display appreciable detergent properties on engine deposits of a soft, grease-like nature and on those parts of an engine where vigorous oil circulation and washing occurs, they are not effective cleansing agents for hard, adherent or baked deposits or in those engine sections where oil flow and attendent washing action is limited.

Furthermore, the detergent and loosening action of heavy-duty oils on soft sludges and deposits involves a serious hazard if adequate precautions are not taken. The sudden loosening of considerable amounts of sludges in badly-fouled engines can readily cause plugging of oil pump intakes and disruption of oil circulation. Serious engine damage can then result if the condition is not noticed soon enough. A sufficient number of such failures have occurred in the field to make this a problem which cannot be ignored.

Although heavy-duty oils have become popularly known as "detergent oils", it appears that a more correct description should be "dispersant oils". While no great harm results from the somewhat inaccurate name "detergent oil," it does seem desirable to emphasize that the essential function of heavy-duty oils is to keep clean engines in clean condition for maximum periods of operation. Since the only thorough and safe means of cleaning a badly-fouled engine is by disassembly and overhaul, it likewise seems desirable to emphasize that heavy-duty oils are not intended as cleaning or purging agents, even though the popular name "detergent oil" might imply this function.

The apparent ability of heavy-duty oils to loosen soft, pasty type deposits from badly fouled engines, introduces a problem which may require serious consideration in post-war years. H. C. Mougey has predicted that heavy-duty oils will become more widely available and will be used extensively for general passenger-car engine lubrication when current restrictions on critical chemicals and additives are lifted.

The potential danger of sudden loosening of certain types of sludges when heavy-duty oils are first added to dirty engines is well recognized, and suitable precautions can be taken in most commercial fleet operations, where there is some measure of control over engine maintenance and lubrication practices. In the case of passenger-cars, where owners frequently use different types or brands of oil with almost every oil addition or refill, there is no control over engine condition and the sludge loosening proclivities of heavy-duty oils thus presents a more serious problem than has been the case to date, where use has been confined largely to controlled fleet operations.—*From a paper presented before the Fuels & Lubricants Meeting of the S.A.E., held recently in Tulsa, Okla.*

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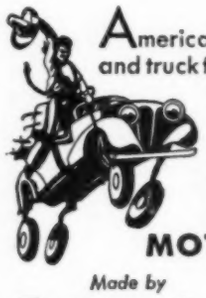
Post-War Truck Design

(*Continued from page* 90)

tures of driver-comfort and operation, and efforts will be made to make entering and leaving the cab easier and quicker.

It is not impossible, as two-way radio systems are promised within reasonable price range, that we shall



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have to make provision in the cabs of the future for fleet operators to have radio communication with their drivers. This might prove valuable to large fleet operators, if wavelengths can be allotted.

We must take accessibility into account more than ever, because operators have demanded it in no uncertain terms. Considerable thought will be given to improving post-war models in this respect. This may call for unconventionality of design, and certainly as far as cab-over-engine is concerned, may call for very special arrangements. In our case, we propose to use a power-operated tilt cab on which we have now had a great deal of experience in the field. With such an arrangement, the accessibility is improved to a point beyond any conventional job at its best. It is expected that the premium which will be paid for such a device will be relatively small, and certainly it can easily be written off on the basis of the operator's experience in reduced maintenance cost. Tilt cabs for cab-over-engine jobs, therefore, are a practical possibility.

Determined effort will be made to improve riding in general, but at the moment we find the conventional type of spring still in the forefront of consideration as the most practical, the most economical, and the easiest to maintain. Knee-action for trucks or torsion-rod suspension systems are still some distance away and, at present, lie in the realm of impracticability, considering the all-around economics.

Engine improvements perhaps should be considered next, and here again there are a number of unknown factors which will either accelerate or retard engine development. Of these, perhaps the most important is the fuel, and apparently it is anyone's guess as to the degree of improvement we may expect in the immediate post-war years. It seems to be quite obvious that we shall get lower octane fuels than have been popularly talked of in newspapers, magazines, etc., but it is conceivable that we may have premium fuels as high as 90-octane with a possible house-brand gasoline of 85.

If such fuels can be obtained generally, then engine development will march ahead at a fairly accelerated rate. If, however, we are going to have the standard house-brand fuel at around 78 to 80 octane, then we could look for design refinements without any major changes. We can expect a higher compression-ratio than we have had in the past, resulting in a reasonable percentage of increase in power output to the extent, perhaps, of 10 to 15 percent. This can be expected without any definite stand being taken as to whether the engine should be of the L-head or the over-head-valve construction. Certainly nothing has shown up yet to cause us to scrap the L-head engine because it has the ability to take advantage of the higher octanes that are expected to be used for many years after the war ceases.

With regard to some of the essential details of engine construction, we can look for a continuation of aluminum pistons, although the methods of manufacture may differ from those in the past. Extruded or forged pistons are a possibility. The treatment of pistons, and for that matter, both cylinder bores and piston rings, is still a matter of experimentation in the aircraft field and certainly will have to be so for some time in the truck field. The chrome treatment of cylin-

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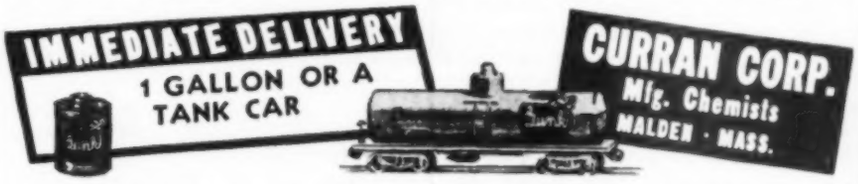

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der bores and rings may have little advantage under excellently controlled conditions, but thinking realistically, it may be necessary because of the impracticability of maintaining those conditions.

With regard to valves—in the past the Achilles heel of the engine—it seems that they have now moved out of this enviable position. In future engines, we may expect to take advantage of aviation experience and, in our particular case, continue the use of liquid-cooled valves which we have found, over the past five or six years to be practical and desirable. The higher first-cost of such valves is of no importance when compared to the obtainable life. This is true, of course, of any design when it is as soundly based as the design of this valve seems to be.

Some seven years ago we started the use of zero-lash tappets because the thermodynamic advantages were obvious and the elimination of the operation of valve tappet adjusting, usually accompanied by much swearing and knuckle-skinning, was considered a step forward for the good of mankind. This has been rewarded with success, and we may expect to see more truck engines with this feature in the future.

The various hardening methods will continue to make simple but properly hardened crankshafts possible, and, in turn, with these induction-hardened crankshafts we shall continue to use precision-type bearings, but with possible changes due to improvements during the war of plating technique. The tri-metal bearing, either of the copper-lead variety or of the silver type, offers a great promise for extended life, and at present there seems to be no reason ever to return to babbitted bearings.

The question of sleeved engines is still one on which no one seems to agree, and the 25 years of experience behind modern truck engines still forms no background on which to base a definite decision. We may, therefore, expect both sleeveless and sleeved engines, unless some new development should come to light that would justify a general use.

There has been much discussion of supercharging in aircraft and the possibility of its use in commercial vehicle engines. Its use on our engines will first depend upon the successful development of a supercharger within a price range that will permit its inclusion in post-war trucks. Aircraft experience seems to mean nothing to the truck industry, so far as getting superchargers at a proper price is concerned. Furthermore, work involving considerable time will have to be done to determine the ultimate benefits of supercharging in certain kinds of service, and maintenance must be very carefully studied before this can be included in the reasonably well-balanced engines that at present exist.

With respect to items such as water pumps, there seems no reason why we should not continue the use of the packless type of pump, even though changes may be made in the cooling system calling for additional loading on the sealing means of this type of design.

Filters, both air and oil, will be given much more detailed study on post-war vehicles. I think the need for extreme care in their maintenance has become very general, and for that reason their inclusion in design will be even more valuable than in the past.

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Then there is the question of oil coolers. Certainly, if over-all engine temperatures are increased and the temperature of the oil raised, then the question of coolers becomes more important. Their successful use will depend on the design of a simple and readily-cleanable unit with efficiencies permitting small size to permit room for it on the engine without eliminating other accessories.

Because of the need for more compact designs and the need for reducing costs and weight in the future, serious consideration will be given to pressure cooling. If some way can be found to eliminate the hazard of uninformed people removing the radiator filling cap at a time when there is pressure in the system, its use may be considerably accelerated. Some fool-proof device is badly needed to meet this condition.

Cooling systems of the by-pass type and thermostats which will take the wear-and-tear more successfully are practical possibilities, and operators will have better assurance of more stable engine temperatures, regardless of the kind of operation.

The transmission picture for post-war models is one that is definitely in a "fluid" stage, and the pun is unconscious. To synchronize or not to synchronize may well be described as the burning issue, with the adherents of synchronization leading the field. The speed of changing with an excellent driver is not accelerated with synchro-mesh; neither are the gears liable to suffer in gear-changing. Nevertheless, because excellent drivers are the exception rather than the rule, synchronizing does offer the possibility of increasing the over-all life of the transmission, providing enough "beef" is put into the synchronizers to eliminate them as a possible source of increased maintenance. Weight and cost will have to be increased and the advantage weighed against that background.

The torque converter, automatic transmission, and fluid clutches will not enter into the picture of on-the-highway service for many years to come, and the development of superhighways may have a lot to do with whether they are used at all in long-distance trucking. However, our past history in connection with the influence of passenger-car design on truck design indicates that our hands may be forced, and against everyone's better judgment, we may attempt to put some degree of automatic gear-changing into the transmission picture for trucks. I am hoping that this will not happen and that only sound considerations will be used to justify the complicated control systems which go with any degree of automatic control. Off-the-road service is another matter, and fluid devices would seem to offer distinct advantages where the gross weights get into the 80,000 and 100,000-pound class.

Rear axles will be principally different in two respects. Brakes will be definitely given a good going over, increased in size, and speeded up in application, and the use of hydraulically-operated brakes may easily be extended to gross weight ranges that previously have been out of the general picture for that type of brake. There will unquestionably be a mixture of axles in the field to the extent that hypoid gears will be considered, but these are not without their problems. It is expected that a very conservative policy will be followed regarding them, so far as our design is concerned. Heavy-duty truck service background is still lacking, and

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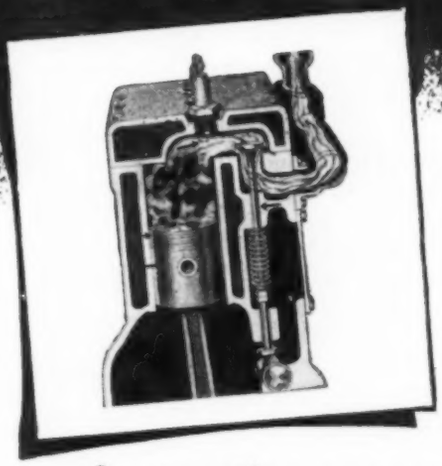

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long ago we learned that our cab tests were but the smaller part of the story.

One of the burning topics, of course, is the question of light-weight metals. We have used aluminum successfully in the past for transmission-cases, bell-housings, oil-pans, radiator shells, and with some degree of success in the engine crankcases. The whole question of its use in the future naturally will depend on price, inasmuch as it hardly seems reasonable to burden a vehicle with increased price when the principal advantage of such reduction might accrue only to one particular type of operator. For that reason, I feel that an all-aluminum engine is not going to be found in the post-war truck, and that it must wait for still further development until a more thorough study is made of the economics involved.

Corrosion in certain parts of the country is still a serious thing in cored passages, and the treatment to prevent it as the present time is a major factor of the cost that might well bar the use of aluminum generally. It is easier to see where axle housings can be considered, but frames are yet in the realm of impracticability. Front axles also will await a great deal of development before we can push them across the highway at the speeds that we now feel are safe for steel. All of which means that, in the final analysis, we cannot expect too much of aluminium in early post-war vehicles. I have purposely left out magnesium because I feel that before its use can be considered, we must do a great deal more research than will be necessary on aluminum. Aluminum has been known for a long time in the automotive field.

Generally speaking, post-war vehicles, I hope, will be simple, functionable, gadget-free designs in which all the "doo-dads" are eliminated and with the full consent of the operators. It is well known that the engineers who design them, and those who later maintain them, are frequently overruled in their desire for simplicity by the sales and advertising departments who feel that a few mills per mile should be thrown to the winds for purposes which they think justify this abandon. Let us hope they will have less influence in terms of stylized appearance and more influence in keeping engineers on their toes in meeting the real demands of transportation.—*From a paper read before the Pennsylvania Motor Truck Association at Pittsburgh, Pa., recently.*

●

REVISE LIQUID-HAUL RATES

● Maximum rates for the transportation of liquid commodities (except milk) in tank trucks by contract motor carriers, have been embodied in a new regulation designed specifically to meet this industry's needs, OPA reported recently.

The new regulation is in effect a simplified restatement of the regulations that heretofore have covered this service; these were the General Maximum Price Regulation and two of its supplementary regulations, No. 14 and 15. . . . Ceiling prices will *not* be changed by this action.

Liquid commodities affected include petroleum products, alcohol, molasses, vinegar, etc.—everything excepting milk, which remains subject to the General Maximum Price Regulation. . . . Any new rates established by carriers must now be reported.

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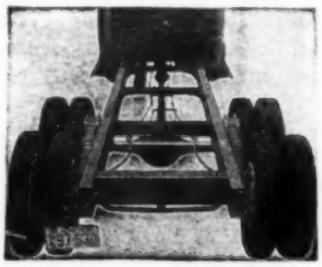
TEN WHEELERS
for 1½ to 5 Ton Trucks



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HAND TOOLS EASED

● Purchasers of coated-abrasive products are no longer required to file Form WPB-3478 and purchasers of certain types of mechanics' hand service tools are no longer required to file Form 1319 to obtain specific authorization, WPB announced recently.

Two deletions from General Scheduling Order M-293, Table 12, affect all types of coated-abrasive products, such as sandpaper and emery cloth, and hand service tools such as pliers, screw-drivers and six types of wrenches. Screening of large orders placed with producers is no longer considered necessary by WPB.

WPB emphasized that purchases of mechanics' hand service tools are still controlled by General Preference Order E-6, (which requires a rating of AA-5 or better for all orders placed with tools producers), and Order L-216, Schedules 2 and 3, (which limits production to specified patterns, types, finishes, etc., and limits use of alloy steels in production of wrenches and pliers).

●

PARTS MAKERS' TROUBLES

● Problems in the production of crtically-needed engine parts for the armed services were discussed recently at a meeting of the Automotive Farm and Tractor Liquid-Cooled Gasoline Engine Industry Advisory Committee to WPB.

In discussing the proposed Direction 2 to Table 4 of General Limitation Order L-293, which would divert a percentage of all manufactured parts to service orders, committee members said this move might result in loss of manpower devoted to engine assembly during the interim needed in supplying this additional requirement of parts and, furthermore, that difficulty might ensue in achieving total engine production once more.

Crankshafts, valves, valve-inserts and gaskets are among engine parts in extremely short supply, committee members said. However, they agreed with WPB officials that the over-all castings supply was improving. . . . John H. Middlekamp, director of the WPB Automotive Division, said: "The alternative solution of sacrificing end-production of engines themselves shows the seriousness of the situation."

Mr. Middlekamp said manufacturers must determine what can be expected from suppliers and thus determine more clearly the percentage of engine parts that could be furnished over and above the concurrent parts now being included in the production schedules.

WPB officials said a blanket order might be put into effect, with varying percentages of parts production worked out with each manufacturer. Then a "screening committee" might be formed to effect the production of desired parts.

WESCO

For Slippery Days Ahead

Tires are getting "smoother" and roads are getting "slicker" as winter approaches. From now on trucks and cars will have to depend on whatever Tire Chains are available—and in these days of short supplies it's more important than ever to equip your cars and trucks with Wesco Tire Chains for their greater wear and longer service.

If you already have Wesco Tire Chains left over from last season, they'll still give you service. Don't buy new ones—conserve yours wherever possible—keep them clean and dry—keep them repaired and ready, for any road emergency. Use them only when necessary and remove them at once when roads are clear.

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Urges Better Lighting to Cut Traffic Accidents

DURING the last year of normal car usage, more Americans were killed in traffic accidents than the total number who died in our Armed Forces during the first two-and-a-third years of the war, A. F. Dickerson, General Electric Lighting division manager, told members of the International Municipal Signal Association at their annual meeting recently. Traffic casualties during the same periods were ten times greater than those suffered in pursuit of the war, he said.

"With more mileage per gallon of gasoline predicted for postwar cars, plus more widespread travel and a rise in car ownership, there probably will be at least a fifty percent increase in mileage by 1950," he said. "Such a congestion of cars will result in a great national fiasco, unless we plan now to prevent it. One of the best remedies is good lighting, a problem to which engineers will give immediate attention after the war.

"Sixty per cent of our 1941 traffic deaths occurred after dark, despite the fact that only one-third of the country's travel is done at night. By properly lighting main city thoroughfares, which represent only ten percent of the street mileage but account for half of all urban accidents, we could save three thousand lives annually. Lighting the proven "death-traps" outside the city, which are mostly suburban in nature, would save another three thousand lives.

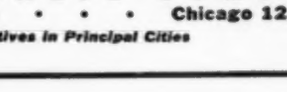
"The life-saving value of good lighting has proved itself wherever tried," he continued. "Detroit's night-to-day fatal accidents were reduced from a ratio of 7.3-to-one, to 1.4-to-one after re-lighting. During the two years following the lighting of New Jersey's continuous highways, night fatalities dropped 76%."

DON'T LET YOUR BUSINESS DIE!

UNLESS you can get new trucks, when your present trucks go to pieces your business will go to pieces along with them.

You can help to keep them running by balancing the wheels of every truck in your fleet without delay.

Don't forget—wheel balancing reduces vibration and conserves mechanical parts.



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SEND
for wall chart showing the pounding effect of unbalanced wheels.

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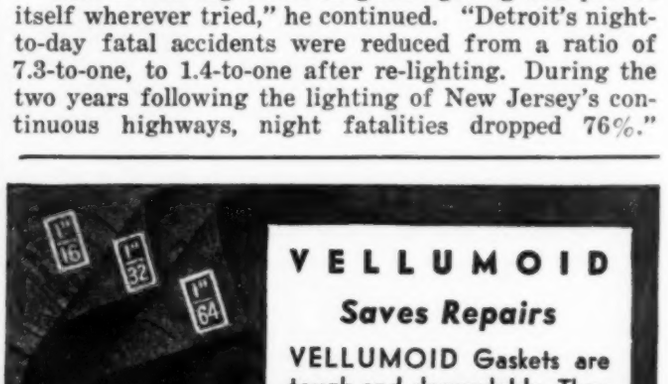

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No one wants to leave your plant with dirty hands. That's the rub. They want clean hands, but they want them *fast.* And they'll use cheap, harsh, harmful hand cleaners that lead to infections and dermatoses unless you make sure they use a really *safe,* as well as fast and effective cleaner.

Keep your plant washrooms supplied with Magnus Hand Cleaner. It cleans fast, but contains no scratchy abrasive or harsh chemicals that rob the skin of natural oils. It cleans well, leaving hands soft and free from chapping or cracking.

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INDUSTRIAL CLEANERS

Hearings Being Held on Radio Use in Highway Transport

FUTURE development and use of two-way radio in the field of highway transportation may be guided by evidence presented at hearings on reallocation of radio wave bands recently conducted before the Federal Communications Commission in Washington.

Highway-user interest centers on the announcement that the hearings (among other reasons) were conducted for the purpose of:

1. "Determining the present and future needs of the various classes of non-governmental services for frequencies in the radio spectrum, from 10 kilocycles to 30,000,000 kilocycles, with the view of ultimately assigning bands of frequencies to such services"; and

2. "Encouraging experimentation along such lines as may be justified from the evidence presented at the hearings."

Possibilities of development of two-way radio in commercial motor vehicle operations were presented by repsentatives of organized truck and bus operators. State highway officials and police officers are seeking to safeguard their respective present and future use of radio in law enforcement, snow removal and highway maintenance.

It is reported that applications for the use of radio wave frequencies already outnumber the frequencies available to non-governmental services and fear is being expressed that future development of radio in highway transportation may be handicapped or even halted by assignment of wave bands to other services.

Interested organizations are seeking to implement experimental use of radio in the motor transportation field by urging the Commission to assign sufficient wave bands for this purpose.

For the purpose of evaluation of services from the standpoint of public need and benefit, the Commission requested information on (a) The dependence of the service on radio rather than wire lines; (b) The probable number of people who will receive benefits from the service; (c) The relative social and economic importance of the service, including safety of life and protection of property factors; (d) The probability of practical establishment of the service and the degree of public support which it is likely to receive; (e) The degree to which the service should be made available to the public, that is, whether on a limited scale or on an extended competitive scale; (f) Areas in which service should be provided and, in general, the points to which communication must be maintained.

Representatives of state and county highway officials in their testimony suggested that the Commission may wish to secure the views of numerous national highway-user organizations before reaching final decisions on reallocation of radio frequencies and this may make it possible for additional interested parties to file statements with the F.C.C. later.

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FOR YOU get extra safety and longer life in every brake—better service with less maintenance from every truck.

Miley Brake Lining is built to take it! . . . it's standing up to the toughest kind of war requirements . . . and you can get it when you need it.

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Standards of Better Lining and Better Service

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Stoody 6 *triples* the life of old valves at minimum expense and effort. Simply weld this special alloy on to valve faces . . . regrind and . . . presto! Your valves have new surfaces that resist wear, impact, heat and corrosion far better than the original steel! No more worry about obtaining new valves—no trouble keeping trucks in operation with old valves! As much as 96,000 miles of service on record with a single set of valves processed with Stoody 6!

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Survey Shows Increase in Pass. Car Age

ALTHOUGH handicapped by a wartime decrease in maintenance facilities and a scarcity of replacement parts, the American automobile is being kept in service by its owner for greatly increased periods of time, a recent U. S. Government survey shows.

Before the war the average life span of a passenger car, between the factory gate and the junk-heap, was 5.8 years. By the end of 1944, with transportation facilities at a premium and prospects for new automobiles not yet in the immediate future, the average age of passenger cars on the nation's highway will be close to 7.2 years.

Since Pearl Harbor, the nation's pool of 29,500,000 registered passenger cars has been reduced to about 25,000,000, with vehicles leaving the road at an estimated average rate of 2,500 a day during 1944.

These findings, pointing up the stake the American public has in speedy postwar reconversion of automobile plans from a transportation standpoint alone, come from the Public Roads Administration which sampled 1,134,093 rural and urban car owners in 23 states and the District of Columbia.

The survey was broken into eleven major occupational groups, ranging from "personal service" to "industrial workers" and "farmers." Automobiles with the highest average ages were owned by the "unskilled laborer" and "farmer" occupational groups, with 8.1 and 7.4 years respectively.

•

Big Union Truck Terminal Planned for N. Y.

NEW YORK, where two-thirds of all merchandise freight entering and leaving the Port District is now carried in motor vehicles, is soon to have its first union terminal, according to plans recently announced. Facilities will include off-the-street bays for handling 136 truck-trailer units and a roof to park them on.

The principal structure of the terminal will be the freight platform 800 feet long and 80 feet wide against which trucks will back from both sides. It will be equipped with an overhead, circular, chain-conveyor towing platform permitting most freight to be handled on wheels, while cranes will be provided for heavy pieces.

Over-the-road commercial vehicles will be able to interchange loads at one spot and freight for distribution throughout the area can be picked up

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MR. TRUCK OWNER:

ALMETAL JOBBERS CAN SOLVE YOUR UNIVERSAL JOINT AND DRIVE SHAFT PROBLEMS. CONSULT THEM FOR HELPFUL ASSISTANCE.

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promptly by local trucks as soon as discharged and sorted. This will eliminate much double handling and intermediate hauling on city streets with ample space for temporary storage of export, damaged and valuable freight.

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Highway Traffic Increases Since War

DURING the first year after the war, increases in inter-city automotive traffic will amount to 38 percent over the 1935-39 average and 6 percent in excess of such travel in 1941, according to estimates of the report, *"Post-war Traffic Levels"* published by the Bureau of Transport Economics and Statistics of the Interstate Commerce Commission.

Conditioning its estimates on the availability of cars, gasoline and rubber, the report states that "with the present attitude of authorities in control of production, these facilities would very likely be available in considerable, if not substantially complete, supply. It seems likely that the end of the European struggle will substantially ease the pressure on certain critical materials and that there will be a considerable expansion in the production of civilian goods."

Citing unprecedented high individual savings and "a large unsatisfied demand for automobiles" the estimators point out that "There will be, of course, a large amount of travel in the first post-war year resulting from the dislocation of persons due to the war production program." It is also foreseen that considerable travel will be generated by the movement of discharged service people back to their homes and jobs.

MOTOR ★PURGE

A Carbon Gum Digester Solvent

A crankcase oil replacement for large size internal combustion engines just prior to engine tear-down and overhaul period for scouring and purging bare metal clean without harmful effect.

Never wears out . . . strain . . . use over and over again . . . improved engine cooling . . . brisk oil circulation and better lubrication by restored original "factory clean" condition.

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THE Everhot Electric Tire Brander is the tire marking tool used by tire companies and fleet operators to *permanently* number every tire with a code number that won't come off. . . . This is a heavy-duty tool that brands *any* set of numbers in a *big* size—easy to read and quick! . . . It will serve you well for many, many years to come.

AFTER the war is won, you will no doubt want to go right on keeping close check on tire costs and mileage. . . . And your Everhot Tire Brander will *still* be one of your most valuable tools . . . That, plus the Everhot Tire Record System. . . . Begin *today* to know where you stand on tires as the tire shortage will be here for some time.

Everhot is now devoting its efforts to helping fleet operators keep all tires rolling. . . . A penny post-card will bring the complete story, as well as free sample tire record cards.

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DUMP BODIES EASED

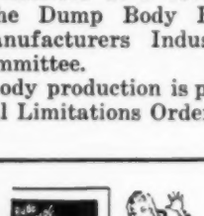
● Removal of restrictions on the production of dump bodies for trucks was recommended at a recent meeting of the Dump Body Hydraulic Hoist Manufacturers Industry Advisory Committee.

Dump body production is prohibited by General Limitations Order 253, except under specific authorization by WPB as to the amount of iron and steel allowed.

Manufacturers are required to file applications for steel under Controlled Materials Plan 4-A, or 4-B in the case of repairs. WPB officials pointed out that although limitations under L-253 might be removed, control would still be exercised by WPB under CMP regulations.

WPB officials said that sheet steel mainly used in dump body production is now in fair supply. Committee members recommended that this production be widened to include six standard models instead of the two standard dump body models now permitted for manufacture.

WPB officials told committee members that, where increased production was involved, Form WPB-3820 must be filed in conjunction with the CMP 4-A or 4-B applications. This form should reflect the number of additional production workers, if any, required to produce the product for which the materials were being requested. . . . No increase in production may be authorized by WPB, it was pointed out, until a favorable recommendation for such increase has been made by the area War Manpower Commission and the area Production Urgency Committee offices. . . . However, WPB said that there is no necessity to submit Form WPB-3820 if the CMP application, or an accompanying letter, states there is no increased production.



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PETROLEUM RULE RELAXED

● Relaxation of material controls in certain petroleum production has been approved by WPB recently. . . . Operators no longer need PAW authorization to use up to $25,000 worth of materials in production, transportation and refining operations. . . . Previously a limit of $10,000 had been in effect.

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● ***The Only Completely-Portable, Self-Contained, Battery-Operated Grease-Gun Equipment***

EXCLUSIVE FEATURES:

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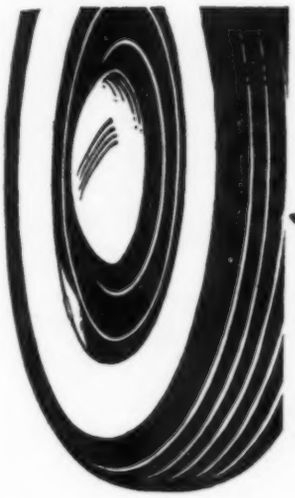

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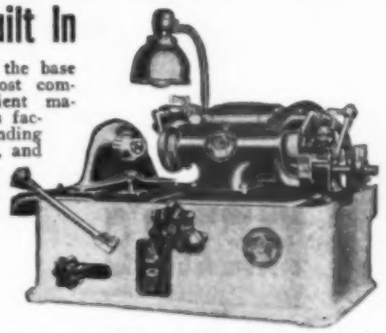

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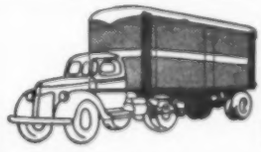

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